
CENSUS OF MANUFACTURES: 1905

(xix)

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CHAPTER I.

SCOPE OF THE CENSUS.

THE FACTORY SYSTEM.

The census of 1905 is the first Federal census of manufactures that has been confined to establishments conducted under what is known as the factory system. This census was taken in accordance with section 9 of the act of Congress of March 6, 1902, which provides, "That in the year nineteen hundred and five and every ten years thereafter, there shall be a collection of the statistics of manufactures, confined to manufacturing establishments conducted under what is known as the factory system, exclusive of the so-called neighborhood and mechanical industries."¹

The line of demarcation between the true factory and the neighborhood establishment is not easily drawn in some industries, and for the purpose of this census a rather broad construction has been given to the term "factory system," based upon the practical conclusions reached at the close of the Twelfth Census. The factory system has been described as confined to the operations of factories, a factory being an association of separate occupations conducted in one establishment in order to facilitate the combination of the processes into which most branches of manufactures are divided.² An establishment in which such an association could be made with advantage would necessarily be of some magnitude and, without further qualification, a factory census would naturally be accepted as an enumeration of large establishments. If only the size of an establishment were to determine whether it should be included, it would be necessary to fix a standard such as amount of capital, number of wage-earners, use of power and machinery, or value of products, and apply the standard uniformly to all establishments.

It would be useless to attempt to take as the standard a certain amount of capital, because capital can not be definitely ascertained; its productive power varies widely in different industries, and even in the same industry the incomplete returns for capital would ren-

der it impossible to predicate on this information either the size of the individual establishment or the probable value of its annual product.

The number of wage-earners varies so greatly during the year, in industries and in establishments in the same industry, that it would not be safe to use either the total or the average number as a standard if the entire field of a factory census is to be covered; and a graded standard for various industries would be impracticable.

The use of power and machinery could not be made an absolute test, because in some important industries included in a broad definition of "factory system," there are large establishments in which no power is used, that would be omitted.

It has been the practice to exclude all establishments with an annual product valued at less than \$500, except that in 1900 statistics for such establishments were taken, although they were not included in the totals, a separate tabulation of them being made. If in fixing a certain value of products as a standard for a factory census, \$10,000, for example, should be taken as the minimum, all establishments having products during the census year of less than that amount would be excluded, whatever their time of operation, and the totals obtained would not be representative figures for some of the important factory industries and consequently would be of no value for comparison with those of prior censuses.

The establishments enumerated at the census of 1905, however, were determined more largely by the industries in which they were engaged than by their size. The essential difference between true factories and neighborhood establishments seems to be that the products of factories are distributed beyond the narrow limits of the communities in which they are located, while the products of neighborhood establishments are consumed by local patrons. In the report of the Twelfth Census it was stated that the "true criterion for manufactures as opposed to the hand trades" was the manufacture of a standard product—that is, a product intended for the general market as distinguished from a product made upon order for a customer. The fact that an establishment manufactured

¹The act of March 3, 1899, provided for "a census of the * * * manufacturing, (and) mechanical, * * * products." Laws, back to 1850, provided for a census of establishments "of productive industry."

²Tenth Census, Manufactures, folio 533, "The Factory System of the United States," by Carroll D. Wright.

for the general market has been the controlling factor to determine whether it should be included in the census of 1905.

INDUSTRIES OMITTED.

The industries that were omitted from the census of 1905 are indicated in the following extract from the instructions to special agents:

20. Establishments engaged in the following industries must not be reported. In some of the industries covered by this list certain establishments are to be omitted and others included in the canvass; the limitations for each industry must be carefully followed.

21. Awnings. (Includes the small establishments that make winflow, porch, and store awnings and place the same for individual customers.) *The manufacture of awnings, tents, or sails for the trade must be reported.*

22. Bicycle repairing.

23. Blacksmith and wheelwright shops. (Includes small blacksmith and repair shops and horseshoeing shops.) *Boiler works, foundries, and machine shops must be reported.*

24. Wheelwrighting. (Includes shops where the whole or chief business is the repair of carriages and wagons, notwithstanding one or two vehicles may be built in such shops during the year.) *Establishments where five or more vehicles were made during the year must be reported.*

25. Boot and shoe custom and repair shops. (Includes shops making boots and shoes to measure for the individual customer, cobbler shops, and the repair work which may be incident to a mercantile shoe business.)

26. Bottling. (Includes all bottling works.) *The manufacture of mineral and soda waters, sirups, tinctures, beverages, etc., must be reported, and if bottling is incident to the same, it should be included in the report.*

27. Carpenter shops. (Includes all kinds of carpentry work, from the small job shop to that of the contractor engaged in the erection of buildings, etc.)

28. Confectionery. (Includes the retail confectioners, and the restaurants, caterers, etc., making candy, ice cream, etc.) *Establishments manufacturing candies, confections, etc., for the trade must be reported.*

29. Custom and merchant tailoring. (Includes the custom and merchant tailors or their contractors working in separate shops, and the small shops in which the work consists chiefly of repairing, pressing, etc.) *Establishments engaged in the manufacture of ready-made clothing on contract or otherwise for the trade must be reported.*

30. Custom gristmills. (Includes custom flour, feed, and grist mills, grinding exclusively for toll and local consumption.) *All mills that do merchant grinding must be reported, although they may also do exchange or custom grinding.*

31. Custom sawmills. (Includes the sawmills engaged exclusively in custom sawing for local consumption.) *All other sawmills, slave or heading mills, shingle mills, and veneer mills, including those sawing on contract, and timber camps must be reported.*

32. Dairies. (Includes all wholesale and retail dairies in cities or rural districts, also cream separating stations where the cream and milk are sold for consumption as such.) *Factories engaged in the manufacture of cheese, butter, or condensed milk, although the sale of cream and milk may be incident to the manufacture, must be reported.*

33. Dressmaking. (Includes the manufacture of women's dresses, garments, etc., to order for the individual wearer.) *The manufacture of women's clothing for the trade must be reported.*

34. Drug stores. (Includes the manufacture of druggists' preparations, patent or proprietary medicines, etc., by retail druggists.) *Establishments manufacturing these goods for the trade must be reported.* The manufacture of these articles at odd times by store clerks whose principal duties are incident to the mercantile part

of the business, even though the product is sold to other stores, should not be reported.

35. Dyeing and cleaning. (Includes shops engaged in dyeing or cleaning articles of wearing apparel, etc.) *Dye works, bleacheries, and print works, conducted independently, dyeing, bleaching, or refining fabrics, and the products of textile mills must be reported.*

36. Electrical repair and construction work. (Includes not only the small establishments wiring buildings, etc., and doing all kinds of electrical repair work, but also the large contractors installing electrical apparatus and doing electrical construction work.) *Establishments manufacturing electrical apparatus and appliances of any character must be reported.*

37. Fur goods. (Includes retail fur stores engaged in making and repairing fur garments for individual customers.) *Establishments engaged in manufacturing fur goods for the trade must be reported.*

38. Hairwork. (Includes establishments making wigs, switches, toppieces, etc., in connection with hairdressing, manicuring, etc., where the employees are placed upon such work only as they are relieved of their regular duties.) *Establishments engaged exclusively in the manufacture of these goods must be reported.*

39. Harness shops. (Includes the numerous repair shops and those chiefly engaged in repair work in connection with a mercantile business, even though some new harness may be made.) *Harness and saddlery factories or establishments making these goods for the trade must be reported.*

40. Ice cream. (Includes the manufacture of ice cream for either the wholesale or retail trade.) *If this manufacture is incident to the wholesale confectionery or other manufacturing industry reported, it should be included.*

41. Jewelry stores. (Includes the repair work incident to a retail jewelry business and the manufacture at odd times by employees engaged primarily in repair work.) *Establishments engaged in the manufacture of watches, clocks, and jewelry for the trade are to be reported. Retailers may also be large manufacturers of jewelry, silverware, etc., and in such cases a report must be secured.*

42. Kindling wood.

43. Locksmith and gunsmith and engraving and diesinking shops. (Includes not only locksmithing and gunsmithing and small shops engaged in custom engraving and diesinking, but a variety of local repair and job work, like bell hanging, umbrella and trunk mending, etc.)

44. Marble and other stone quarries. (Includes establishments engaged exclusively in quarrying, or in getting out rough stone, crushed stone, etc.) *All other marble and stone work, including quarries where the cutting and finishing also is done, must be reported.*

45. Masonry, brick and stone. (Includes all masonry, brick or stone work, whether done by large contractors, individuals, or companies, in the erection or repair of buildings, bridges, subways, sewers, etc.)

46. Millinery, custom work. (Usually connected with millinery stores, and the work consists in making or trimming hats, bonnets, etc., for the individual customer.) *Establishments engaged in the manufacture of millinery goods for the trade must be reported.*

47. Monumental work. (Includes small establishments lettering monuments, tombstones, etc., and doing local cemetery stone-work.) *Marble and stone quarries making monuments and tombstones, and large establishments cutting and finishing monuments and tombstones, must be reported.*

48. Opticians. (Includes retailers of optical goods, or opticians where the work consists in grinding lenses or fitting spectacles, eyeglasses, etc., to individual customers.) *Establishments manufacturing optical goods for the trade must be reported.*

49. Painting, house, sign, etc.

50. Paper hanging.

51. Paving. (Includes establishments engaged exclusively in the laying or repairing of pavements, sidewalks, etc., of asphalt, concrete, stone, brick, wood, etc.) *Establishments engaged in the manufacture of paving materials of any character must be reported.*

52. Photography.
53. Picture framing. (Includes the framing and gilding done at picture stores.) *Establishments engaged in the manufacture of looking-glass and picture frames for the trade must be reported.*
54. Plastering and stuccowork.
55. Plumbing. (Includes establishments engaged in plumbing, gas fitting, or in steam fitting.) *Establishments engaged in the manufacture of plumbers' supplies or materials, gas fixtures or steam fittings and apparatus must be reported.*
56. Printing and publishing. (Includes the soliciting of contracts for printing where no work is done in connection with the preparation of the manuscript, printing, binding, circulation, etc.) *All establishments in which printing of any character is done, also publishers who assist in the revision of manuscript, binding, furnishing of paper, circulation, etc., although they do no printing, must be reported.*
57. Repairing and upholstering furniture. (Includes the custom work and repair shops and the incidental manufacture and repair work done by furniture dealers.) *Furniture factories of every description must be reported.*
58. Roofing. (Includes establishments engaged exclusively in laying roofing of gravel, pitch, felt, etc., and of slate or tile.) *Establishments engaged in the manufacture of roofing materials of any character must be reported.*
59. Sewing machine repairing.
60. Taxidermists.
61. Tin shops. (Includes the tin shops engaged in custom or repair work, or establishments where the work is merely incident to a mercantile business.) *Tin shops where goods are made in considerable quantities, or where roofing, etc., is manufactured, must be reported. Coppersmithing and sheet iron working must be reported.*
62. Typewriter repairing.
63. In addition to the above, reports must not be secured for manufacturing in educational, eleemosynary, and penal institutions, nor for the following, which are sometimes classed as manufacturing industries:
 - Bill posting.
 - Building and construction work.
 - Cotton cleaning and rehandling.
 - Cotton compressing.
 - Cotton ginning.
 - Dentistry.
 - Dressing, packing, and shipping of poultry.
 - Electric light and power.
 - Excavating and well digging.
 - Fisheries. *The canning or preserving of fish and oysters must be reported.*
 - Florists and floral designs.
 - Hay and straw baling.
 - Ice harvesting.
 - Junk shops.
 - Laundries.
 - Mining.
 - Moving and raising buildings.
 - Packing and shipping of fruits and vegetables. *The canning or preserving of fruits and vegetables must be reported.*
 - Professional services.
 - Rectifying and blending of liquors.
 - Retail butchers.
 - Salting hides.
 - Telegraph and telephone companies.
 - Tobacco stemming and rehandling.
 - Transportation and express companies.
 - Trimming and finishing coffins and burial cases by undertakers, or undertaking and funeral directing. *Establishments engaged in the manufacture of coffins and burial cases for the trade must be reported.*
64. The object of the omission from the census of the class of establishments indicated by the above list is to confine the census as far

as possible to an enumeration of the factory industries. In many instances the same industry is carried on in large and small establishments, and as a rule no distinction is made in the size of the establishment to be reported. It is only in cases where the manufacture is incident to a mercantile business that the agents are called upon to exercise discretion in regard to securing the report. The sale of the product is necessarily incident to all manufacturing and must, in many cases, be included in the reports. In some establishments, such as confectionery stores, harness shops, and jewelry stores, if manufacturing is carried on, it is incident to the mercantile business and should not be reported. An establishment of this character, to be reported, must have employees engaged exclusively in manufacturing work and sell the product to the trade. Establishments where the manufacturing is done at odd times by the clerks in the store or by employees engaged for repair work must not be reported.

Modification of rule.—The list of omitted industries includes all of the neighborhood and mechanical industries such as blacksmithing and wheelwrighting, boot and shoe custom and repair work, and the building trades, but the modifying instructions following each omitted industry in which there might be establishments engaged in the production of standard articles, were introduced so as to insure the collection of reports from all establishments that could by the broadest construction be included in a factory census. Therefore the omission of industries in which the small establishments abound, and the elimination of practically all establishments in which the product is manufactured on the order of customers, has not resulted in excluding all small establishments. The instructions have tended to include all establishments conducted under the factory system, a complete enumeration of such being made for each industry.

The elimination of establishments that do not manufacture a standardized product greatly reduces the number reported for some industries. For instance, there were 25,258 flour and grist mills reported at the census of 1900 with products valued at \$560,719,063, but when the totals were revised in order to obtain figures that could be compared with the statistics for 1905, which relate only to those mills that do some merchant grinding, it was found that 15,782 establishments should be omitted, reducing the number from 25,258 to 9,476, or 62.5 per cent, and the value of product from \$560,719,063 to \$501,396,304, or 10.6 per cent.

The sawmills engaged in custom sawing or in sawing for consumption in the neighborhood were omitted from the census of 1905, and to reduce the totals for 1900 to a comparative basis it was necessary to exclude the reports for 9,982 establishments with products valued at \$11,635,713, the number forming 30.2 per cent and the value of products 2.1 per cent of the corresponding totals for "lumber and timber products" at the Twelfth Census. Therefore, the omission of the mills engaged in custom grinding and sawing has had but slight effect on the totals for the industry other than in the reduction of the number of establishments.

Exceptions.—The deviations in the line of demarcation between the establishments included and those omitted may be illustrated by the conditions in a few industries. While the harness factories that manufacture a standard product for sale in the general market produce the major portion of the harness made, large quantities are produced in harness shops manufacturing both for the general market and on order from customers, the value of the latter class of goods, however, predominating. In some sections these shops are very numerous and many of them are of considerable size. The instructions required the agents to omit shops engaged chiefly in repair work in connection with a mercantile business, even though some new harness was made, but to report all "harness and saddlery factories or establishments making these goods for the trade." These instructions were prepared in such a manner as to permit the agents to exercise some discretion in determining the class of establishments to be reported, and reports were accepted for large establishments even though the greater part of the product was manufactured on orders received from customers. The extent to which the small harness shops were omitted is indicated by the records of the canvass of Kansas. The original lists for this state contained the names of 574 establishments which appeared from the trade and local directories, trade journals, etc., to be engaged in the manufacture of harness, but after investigation 553 of them were omitted from the enumeration, only 21 establishments being accepted as of the character to be included in this census.

Since the manufacture of bread and other bakery products was not included in the list of industries to be omitted, the rule was that agents should enumerate all establishments on the assumption that they all manufactured for the trade. Many bakers, however, sold their products at retail, and others manufactured confectionery as well as bread, and also did a small mercantile business. In these cases exception was made, and the agents were required to omit small establishments that did a miscellaneous business.

While separate classifications are provided for marble and stone work and for monuments and tombstones, and separate statistics are presented, both classes of products are often manufactured by the same establishment, and a definite demarcation of the statistics is in many instances impracticable. Moreover, all classes of stone products are now manufactured largely in connection with the operation of the quarries. The statistics for quarries, as required by the act of March 6, 1902, form a part of the census of mines and quarries and therefore should not be included in the census of manufactures. It would be impracticable for a quarryman to make separate reports for the cutting and dressing of stone and the manufacture of monuments or other products at the quarry, since both

branches of the work are carried on by the use of the same capital and largely by the same employees, and no separation is made of the expenses. Therefore the instructions to the agents provided that the entire establishment, including the quarry, should be reported as a manufacturing establishment when it was engaged in cutting and finishing stone or in the production of monuments and tombstones. There are, however, many quarries producing rough rock for foundation or road work, cutting paving blocks and slabs without the use of machinery, or quarrying marble and other rough stone for sale as such. All quarries yielding products of this character were omitted from the census of manufactures because they could with greater propriety be included in the census of mines and quarries. The lettering of monuments and tombstones and local cemetery work were also omitted from the factory census because such work was in the nature of a neighborhood industry.

SPECIAL FEATURES.

Calendar year covered.—The census of manufactures of 1905 covers the calendar year 1904, while all prior censuses relate to the fiscal year ending May 31. In the absence of a legal provision as to the period to be covered, the calendar year was selected because the majority of the manufacturers close their books on December 31, and it would be more convenient to make the Census report for the year ending with that day. It has been the practice at all censuses to accept reports for the business year most nearly conforming with the census year, and the results, therefore, can not be accepted as representing totals for the same period of twelve months for all establishments. In some industries the business year is controlled by the year regulating the supply of raw material. For instance, in the manufacture of cottonseed products the business year, as a rule, conforms with the commercial crop year from September to September. Therefore in the case of this industry the change from the fiscal to the calendar year has had very little effect on the totals as compared with those for former censuses.

Territory canvassed.—The territory covered in the canvass for this census embraced continental United States and Alaska, but not Guam, Hawaii, the Philippine Islands, Porto Rico, or the American islands of the Samoan group.

Supplemental schedules.—The census of 1880 was the first to contain special reports for the principal industries. A special schedule was used to develop the statistics which contained all of the usual inquiries and also inquiries concerning the details for materials, products, and machinery. This practice was followed at the censuses of 1890 and 1900. At the census of 1905 a supplemental schedule was used which contained only such inquiries as were necessary to develop the statistics for the special report. The use of this supple-

mental schedule enabled the work on the general and special reports, both in the field and in the Office, to proceed contemporaneously.

Temporary and regular employees.—At all prior censuses both the actual fieldwork and the work of supervision were carried on by temporary employees—that is, supervisors, enumerators, and special agents. The canvass of 1905 was made under the immediate supervision of the regular employees of the Bureau of the Census. In each of the large cities one of these employees was placed in charge of a number of local agents; in the smaller cities and in some of the smaller but important manufacturing states, where a temporary local agent or agents were required, regular employees worked with the local agents, either during the entire canvass or for a sufficient time to give thorough instructions. The canvass of the greater part of the rural sections and, in some instances, of entire states and territories was made by the regular employees. The reports have, therefore, been prepared with great care, and are more nearly uniform than at any previous census.

OFFICE AND FIELD WORK.

List of manufacturers.—A complete card index of the names and addresses of the establishments was prepared as a basis for the fieldwork. A list was made of the establishments reported at the Twelfth Census and the names and addresses were compared with those shown in city, county, state, and trade directories, in private lists of manufacturers, and in lists prepared by the bureaus of labor and industry in the different states; in fact every source of information concerning the location of manufacturing establishments was utilized. The list prepared necessarily contained the names of a large number of individuals, firms, and corporations that were not engaged in manufacturing but that for business reasons, advertised as manufacturers. The list also contained numerous duplications, since the name of the same establishment appeared in the directory for every city in which it had a sales agency or office, and the fact that the plant was not located in the city could not be detected from the directory. Moreover, different directories gave the same establishment with a slight variation in the name. The duplications for establishments in the same city were eliminated to some extent by an alphabetical arrangement of the cards. But the fact that the name of an establishment appears in several directories is not conclusive that the names should be treated as duplicates, since many companies operate plants in a number of cities. The duplicates and the names which were not those of legitimate manufacturers could be eliminated only by

a personal visit or by correspondence. A circular¹ was sent to each establishment to ascertain the location of the factory, the character of the product, and other information that would be of assistance in securing the report. The replies to this circular disposed of a large proportion of the cards for establishments that were not engaged in manufacturing. The census schedules² were then mailed to all of the remaining establishments, with the request that the reports be prepared and returned so as to avoid the necessity of a visit from an agent. A large number of satisfactory reports were received through the mail. After allowing sufficient time for the return of the schedules the cards were arranged by districts, the entire country being divided into about 1,000 districts, each district containing the number of establishments that could be visited by an agent in approximately sixty working days. The cards for each district were arranged as nearly as possible in the order in which the agent should visit the establishments when making the canvass. A typewritten list of the names was then made, a

¹ The preliminary circular sent all establishments was as follows:

Department of Commerce and Labor, Bureau of the Census, Washington.

Division of Manufactures.

October 3, 1904.

SIR:

To comply with the requirements of the act of Congress of March 6, 1902, the collection of the reports for the census of manufactures of 1905 will be started on or about January 1.

Your establishment appears on the records of this Office as engaged in manufacturing. In order to perfect the records, to avoid unnecessary correspondence, and what might be the needless call of a special agent of this Office, you are requested to answer the following questions and return this circular in the inclosed envelope, which requires no postage.

Name of establishment.....
Name of owner..... State.....
Post office..... Street..... Number.....
Location of factory: State..... County..... City.....
If you operate other factories, give name and location of each.....
Enumerate or describe the articles produced during 1904.....
If you are not a manufacturer, please describe the business or occupation in which you are engaged.....
If your factory is idle, when did it close.....
If you have retired from business, when did you retire.....
Please give the name and address of your successor, if any.....

Your prompt attention to this request will be appreciated.
Very respectfully,

S. N. D. NORTH,
Director.

(Inclosures.)

² The following circular was used in transmitting the schedule:

Department of Commerce and Labor, Bureau of the Census, Washington.

Division of Manufactures.

December 1, 1904.

SIR:

As intimated in letters heretofore sent you, I inclose a blank schedule for the report of your manufacturing establishment, required by the act of Congress of March 6, 1902, providing for a census of manufactures of the United States. The provisions of law and assurances in regard to the confidential character of the information are printed on the title page of the schedule. The report should cover the calendar year ending December 31, 1904, or the business year that most nearly conforms to it.

The schedule is as simple as the requirements of the law will permit, and careful instructions are given for each question. Kindly supply the amounts required by each inquiry, and if the inquiry is not applicable to your establishment, write the word "None" in answer to it. If book accounts are not available for exact data, careful estimates will be accepted.

Actual field work on the census must begin on January 3, 1905. I hope you will find it convenient to forward the completed schedule in the inclosed official envelope by January 15, and avoid the necessity of a special agent calling on you. Your attention to this matter will greatly aid in the completion of a very important statistical work.

Very respectfully,

S. N. D. NORTH,
Director.

(Inclosures.)

carbon copy being retained in the Office. The Office copy of the list was checked as the cards and schedules were returned by the agents. In this manner a current record was kept of the canvass in every district, and each establishment was accounted for. The agents were required to make careful inquiry for other establishments than those listed, and to make a thorough canvass of their respective districts, securing reports from all establishments that were in operation during any portion of the year.

Schedule and instructions.—All establishments were reported on a general schedule of 4 pages, containing 13 general inquiries relating to capital, employees, salaries, wages, miscellaneous expenses, cost of materials, value of products, time in operation, and power used. In addition to a report on the general schedule, establishments engaged in 84¹ of the principal industries were required to furnish reports on supplemental schedules showing the quantities and values of the different materials or products, and, in some instances, certain details concerning machinery used. The inquiries of these supplemental schedules were, in the main, the same as the inquiries on the same subjects at the census of 1900.

Canvass.—The actual fieldwork was started on January 3, 1905, when a number of the regular employees of the Office commenced work in Baltimore, Md. Work was started in other sections of Maryland and throughout the United States as rapidly as possible, the height of employment being reached in the month of April, when 835 regular and temporary employees were at work. It was impossible to begin the work in all sections of the country at the same time, and it was

found that better results were obtained by allowing some of the agents to remain a longer time in the field and canvass several districts. The services of the temporary agents were dispensed with by June 1, and practically all of the regular force returned to the Office by October 1, 1905. The total cost of the canvass, including the salaries of the detailed clerks, was approximately \$445,000.

Classification of industries.—The classification of the reports² for the various establishments is one of the most important branches of the office work. As explained elsewhere,³ an establishment may consist of a single mill or of several mills, and be engaged in the manufacture of a single class of articles or of a great variety of products. It was necessary to classify the reports so as to allow a grouping of the statistics for establishments engaged in the same or allied indus-

² The following instructions were used in classifying schedules:

The classification of reports is the assignment of the schedule for each manufacturer to a specific industry and to a particular generic group of industries in order to bring together the reports for all establishments engaged in the same industry. It is the first and most important step in the compilation of the data, and the utmost care should be exercised at every stage of the work. The clerks engaged in classifying should be familiar with the use of all the supplemental schedules and the methods of presenting the statistics in the final volumes. The completeness of the Census reports is largely controlled by the classification of the individual schedules. If, upon comparison of the number of establishments reported for the census of 1905 with those for 1900, it appears that there has been a decrease or an exceptionally large increase, the conclusion, in the absence of other information, will be that the schedules have been wrongly classified. It is difficult to detect an error in classification before the completion of the final tables, and changes will then necessitate the correction of a large number of totals and a serious delay at a critical stage of the work.

The general rule for classification is that the schedule must be assigned to the industry indicated by the product of chief value. For instance, if an establishment is engaged in the manufacture of both men's and women's clothing, the value of the two classes of clothing should be determined before classifying the report. If the product of men's clothing is in excess of that of women's clothing the report should be classified "clothing, men's." This general rule is to be modified by other conditions indicated by the schedule, such as the commercial designation of the factory, the class of materials used, and the character of machinery. For example, an establishment engaged in the manufacture of astrakhan cloth produced such cloth to the value of \$206,085, using woolen yarn to the value of \$93,815, and cotton yarn to the value of \$40,233. In the absence of other information, this factory would be classified as "woolen goods," but knitting machines and winders are the only machinery used, and its proper classification is "hosiery and knit goods."

Having decided the classification, the industry number as shown by the attached list must be given in the upper left-hand corner of title page, just under the border, and the title of the industry written in the space below the inquiries in regard to the location of the factory and general office.

Many establishments are engaged in the manufacture of a great variety of articles, and the assignment of the schedule to a specific industry according to its product of chief value results in the inclusion in that classification of products which are not designed for the same purpose. This can not be avoided, but there are some industries carried on by the same establishment but of such a distinct character and of such importance that it is necessary to make separate reports; for instance, the manufacture of lumber and salt are frequently carried on by the same company or individual, but as the statistics for these industries are compiled separately, separate reports must be prepared and each given its proper classification.

While it is desired to obtain complete reports for each industry represented by the supplemental schedules, there are establishments engaged in the manufacture of products named on two or more of the supplemental schedules for which it is impossible to secure complete separate reports. For instance, an establishment reported on the supplemental schedule for "cottonseed products" may produce large quantities of fertilizer, though not sufficient to control the classification of the report, which would be classed as "oil, cottonseed and cake;" the quantity and value of the fertilizer would be shown in the special tabulation, and added to the amounts reported by establishments classed as "fertilizers."

Some establishments are engaged in the manufacture of products covered by two or more supplemental schedules, but enumerated on only one of these schedules. For instance, a turpentine distillery may be operated in connection with a lumber mill, but it is impossible to secure complete separate reports for each industry, but the respective supplemental schedules have been furnished. In such cases the general schedule must be classified and both supplemental schedules retained with it until separated in the editing section. The significance of the supplemental schedules must be thoroughly understood, and the necessity and practicability of separate reports considered before classification.

In case of uncertainty concerning the classification, the report made by the establishment at the Twelfth Census should be consulted, and the classification then used should be followed unless it was manifestly wrong, or there has been an entire change in the class of product. If, however, the classification for the Twelfth Census has been subdivided, the report should be classified according to the classification for 1905.

If the establishment is engaged in an industry for which a supplemental schedule is required and the supplemental schedule has not been secured, and it can not be prepared from data contained in the general schedule, it should be returned for correction to either the special agent or the establishment, as may be required, with the customary letter.

The list of classifications gives the name of each classification and its number, also the general group number to which the class belongs and the classification number used in 1900. The classifier is concerned only with the name and number of classification for 1905.

³ See page xli.

¹ The following is a list of the industries for which the 59 supplemental schedules were provided, some of these schedules being used for more than one industry: Agricultural implements; automobiles; beet sugar; bicycles and tricycles; boots and shoes; brick and tile; butter; buttons; canning and preserving, fish; canning and preserving, fruits and vegetables; canning and preserving, oysters; carpets and rugs, other than rag; carriages and wagons; cars and general shop construction and repairs by steam railroad companies; cars and general shop construction and repairs by street railroad companies; cars, steam railroad, not including operations of railroad companies; cars, street railroad, not including operations of railroad companies; cheese; chemicals; coke; condensed milk; cordage and twine; cotton goods; cotton small wares; dyeing and finishing textiles; dyestuffs and extracts; electrical machinery, apparatus, and supplies; explosives; felt goods; fertilizers; flour and grist mill products; gas, illuminating and heating; glass; gloves and mittens, leather; hats, felt; hats, wool; hosiery and knit goods; ice, manufactured; iron and steel, blast furnaces; iron and steel, steel works and rolling mills; jute and jute goods; leather, tanned, curried, and finished; linen goods; lumber and timber products; metal working machinery; musical instruments, organs; musical instruments, pianos; needles, pins, and hooks and eyes; oil, cottonseed and cake; oil, essential; oilcloth and linoleum, floor; oilcloth, enameled; paints; paper and wood pulp; pencils, lead; pens, fountain and stylographic; pens, gold; pens, steel; petroleum refining; pottery, terra cotta, and fire clay products; printing and publishing, book and job; printing and publishing, music; printing and publishing, newspapers and periodicals; rice, cleaning and polishing; salt; shipbuilding, iron and steel; shipbuilding, wooden, including boat building; shoddy; silk and silk goods; slaughtering and meat packing, wholesale; slaughtering, wholesale, not including meat packing; smelting and refining, copper; smelting and refining, lead; smelting and refining, zinc; soap; starch; sulphuric, nitric, and mixed acids; tin andterne plate; turpentine and rosin; varnishes; wood distillation, not including turpentine and rosin; woolen goods; worsted goods.

tries. Each report was accordingly assigned to one of the 339 classifications for which the statistics are shown separately.

There were 354 separate industry classifications used at the census of 1900. The exclusion of the hand trades and neighborhood and mechanical industries resulted in the omission of 28 of these. In addition, 6 classifications were, by name or by inclusion of the statistics heretofore shown under them, added to others, and one was not used, no return being received that was properly classifiable under it. This has reduced the number of classifications used

in 1900 to 319 in 1905. Some industries have become so specialized that it has been possible to subdivide the classifications under which they were placed in 1900. For example, at the census of 1905 the manufacture of automobiles had become so distinctive an industry that a separate classification was necessary. The statistics of cheese, butter, and condensed milk were also classified separately.

The changes in the wording of classifications and the names of new classifications are shown in the following statement:

Classifications of 1900 which have been changed in form or wording for 1905.

1900	1905
Boots and shoes, factory product.....	Boots and shoes.
Bridges.....	Included with structural ironwork.
Cardboard.....	Cardboard, not made in paper mills.
Carpets, wood.....	Wood carpet.
Cheese, butter, and condensed milk, factory product.....	Butter.
	Cheese.
	Condensed milk.
Clothing, men's, factory product.....	Clothing, men's.
Clothing, men's, factory product, buttonholes.....	Clothing, men's, buttonholes.
Clothing, women's, factory product.....	Clothing, women's.
Collars and cuffs, paper.....	Included with collars and cuffs.
Copper, smelting and refining.....	Smelting and refining, copper.
Druggists' preparations, not including prescriptions.....	Druggists' preparations.
Electrical apparatus and supplies.....	Electrical machinery, apparatus, and supplies.
Fish, canning and preserving.....	Canning and preserving, fish.
Flouring and grist mill products.....	Flour and grist mill products.
Fruits and vegetables, canning and preserving.....	Canning and preserving, fruits and vegetables.
Fuel, artificial.....	Fuel, manufactured.
Fur hats.....	Hats, felt.
Furniture, factory product.....	Furniture.
Gas and oil stoves.....	Stoves, gas and oil.
Gloves and mittens.....	Gloves and mittens, leather.
Hats and caps, not including fur hats and wool hats.....	Hats and caps, other than felt, straw, and wool.
Horseshoes, factory product.....	Horseshoes.
Iron and steel.....	Iron and steel, blast furnaces.
Iron and steel, nails and spikes, cut and wrought, including wire nails.....	Iron and steel, steel works and rolling mills.
	Iron and steel, nails and spikes, cut and wrought, including wire nails, not made in rolling mills or steel works.
Ironwork, architectural and ornamental.....	Structural ironwork.
Kaolin and other earth grinding.....	Kaolin and ground earths.
Lead, smelting and refining.....	Smelting and refining, lead.
Leather board.....	Included with leather goods.
Lime and cement.....	Lime.
	Cement.
Models and patterns.....	Gypsum wall plaster.
Musical instruments, organs and materials.....	Models and patterns, not including paper patterns.
Musical instruments, pianos and materials.....	Musical instruments, organs.
	Musical instruments, pianos.
	Musical instruments, piano and organ materials.
Needles and pins.....	Needles, pins, and hooks and eyes.
Hooks and eyes.....	
Oilcloth, floor.....	Oilcloth and linoleum, floor.
Oysters, canning and preserving.....	Canning and preserving, oysters.
Paper hangings.....	Wall paper.
Paving and paving materials.....	Paving materials.
Plated and britannia ware.....	Plated ware.
Registers, car fare.....	
Registers, cash.....	Cash registers and calculating machines.
Roofing and roofing materials.....	Roofing materials.
Ship and boat building, wooden.....	Shipbuilding, wooden, including boat building.
Silversmithing.....	Silversmithing and silverware.
Silverware.....	
Soap and candles.....	Soap.
Sugar and molasses, beet.....	Candles.
Tinsmithing, coppersmithing, and sheet iron working.....	Beet sugar.
	Tinware.
Varnish.....	Coppersmithing and sheet iron working.
Whalebone and rattan.....	Varnishes.
Window shades.....	Whalebone cutting.
Wool hats.....	Window shades and fixtures.
Zinc, smelting and refining.....	Hats, wool.
	Smelting and refining, zinc.

New classifications.

Class in which reports were included at the Census of 1900.	1905
With Marble and stone work.....	Artificial stone.
With Carriages and wagons.....	Automobiles.
With Furnishing goods, men's.....	Automobile bodies and parts.
With Carpentering.....	Collars and cuffs.
With Hats and caps, not including fur hats and wool hats.....	Dairymen's, poulterers', and apiarists' supplies.
With Foundry and machine shop products.....	Hats, straw.
With Coffee and spice, roasting and grinding.....	Locomotives.
With Plastering and stuccowork; Fancy articles, not elsewhere specified.....	Peanuts, grading, roasting, cleaning, and shelling.
With Foundry and machine shop products.....	Statuary and art goods.
With Chemicals.....	Stoves and furnaces.
	Sulphuric, nitric, and mixed acids.
	Wood distillation, not including turpentine and rosin.

This segregation, of which these are examples, has added 20 to the revised list of classifications shown in 1900, making 339 in all.

The assignment of reports to the different industries was made according to the product of chief value, and therefore it does not follow that the establishments reported for any particular industry are the only establishments engaged in the production of the articles covered by that classification. The manufacture of "shirts" is shown as a separate industry, but some of the establishments which are classed under "furnishing goods, men's," also make shirts. Therefore the figures for shirts can not be considered as representing the entire production for the census year, nor should they be accepted as referring to shirts as a sole product.

For the same reason, establishments may be assigned to different classifications at succeeding censuses, depending upon their product of chief value during the year covered. Under these conditions the comparative figures for a given industry can not be accepted as representing in every instance the same establishments for each census, less those that have gone out of existence and plus those that have commenced operations in the intervening periods.

The changes in classification depending upon class of products has but slight effect on the large staple industries, such as the manufacture of flour, lumber, and cotton, silk, or woolen goods. Establishments engaged in these industries are equipped with special machinery, and their products are of such a uniform character that the reports would necessarily be assigned to the same classification at succeeding censuses.

Subsidiary products.—In addition to the manufacture of articles covered by the classifications to which the schedules were assigned, a number of establishments produced articles provided for by one or more of the supplemental schedules.¹ As the value of the articles covered by the supplemental schedule was not sufficient to control the classification, they were considered as subsidiary products. In order to show in the special reports the total quantity or value of any product made in the United States, it was necessary to consider all of these subsidiary products. For example, a schedule might show that an establishment should be classed under "foundry and machine shop products," although it manufactured a quantity of agricultural implements. In order to show the total number and value of the agricultural implements manufactured in this country, it was necessary to include those manufactured by all establishments, however classified. This was accomplished by combining the value of the agricultural implements reported as subsidiary products of various industries with the value of the products reported under the

classification "agricultural implements." If this practice had not been followed, the subsidiary agricultural implement products would have been lost in the general classification "foundry and machine shop products."

Examination of schedules.—This examination is the preparation of the reports for tabulation. Each schedule was examined to correct inconsistencies and errors that might have occurred in its preparation. The average number of wage-earners employed during the entire year was computed from the average returned for each month, and all additions tested.²

At prior censuses the chief difficulty in editing schedules was in obtaining answers to essential inquiries, when the answers had been omitted by the enumerator or local agent, who not being familiar with the Office methods, could not appreciate the importance of covering the main points of the schedule. This omission of essential information in the schedules of 1900 necessitated a large correspondence between the Census Office and the establishments. The fieldwork for the census of 1905, however, was done by or under the immediate supervision of the regular employees of the Office. These employees were given careful instructions in the preparation of the schedules, and their prior experience in general census work enabled them to appreciate the importance of consistency in the replies to the different inquiries. A number of the earliest reports secured by each agent were given a preliminary examination immediately upon their receipt at the Office and returned with letters of criticism. These practices resulted in simplifying the Office work and transferring to the field force a considerable proportion of the work done in the Office at prior censuses in connection with the editing of the schedules. For example, in editing the reports for the lumber industry at the census of 1900 it was necessary to send out about 6,000 special letters, requesting replies to inquiries that were not answered when the schedule was filled out. Only in comparatively few instances was it necessary, at the census of 1905, to call on an establishment for additional information after the report had been received at the Census Office. The schedule for the lumber industry at the present census, as well as at the census of 1900, probably presented as many difficulties, both in its preparation in the field and in its revision in the Office, as any other schedule, and the far neater condition of the schedules for this industry at the present census as compared with those at the census of 1900 furnishes a safe indication of the difference in the quality of fieldwork at the two censuses as applied to all schedules.

Tabulation.—The statistics for the census of 1905 are presented by specified industries for the United States, for each state and territory, and for the cities

¹ See page xxvi for industries covered by supplemental schedules.

² For copy of the instructions, see Appendix C, page 637.

having a population of 20,000 and over at the census of 1900. Moreover, the totals for the United States, for each state and territory, and for selected industries are grouped by character of ownership—individual, firm, incorporated company, or miscellaneous—and by value of products, and the totals for each municipality having a population of 8,000 and over at the census of 1900 are grouped by character of ownership. To facilitate these presentations the schedules were assorted by states, cities, industries, character of ownership, and value of products. The tabulation of the schedules in this order brought together the totals for the largest possible number of reports for a given group. Most of the tabulation was done on the wide carriage typewriter, fitted with a tabulating attachment. Carbon copies were used in making the combinations by character of ownership and by value of products, thus avoiding the retabulation of the schedules. The adding machines were also used to great advantage. These methods are similar to those followed at the Twelfth Census, which are fully described in Part I of the reports on manufactures for that census and, therefore, no extended reference to them is necessary in this connection.

CHANGES IN METHODS.

Treatment of certain industries.—At the census of 1905 a change was made in the method of compiling statistics for "lumber and timber products." Under the heading of "capital" for the industry as a whole, the principal change has been the elimination of the item of standing timber or timbered lands. Investments of this character have formerly been included under capital invested in land. Since on the schedules for all other industries the item of land is intended to cover only capital invested in land used for the plant sites, the relatively large showing for this item of capital in the lumber industry for 1900, when considered in connection with that for other lines of manufacturing, was misleading, and when the total for this industry was added to the totals for other industries for a city, state, or the United States, the statistical value of the average investment per establishment for this item of capital was virtually destroyed. At the census of 1905 a special inquiry was placed upon the supplemental schedule for lumber and timber products, and detailed information covering investments in timber lands was secured.

Until the present census provision was not made for treating logging operations conducted in connection with sawmill plants as a distinct and complete branch of the lumber industry. Statistics had been collected bearing on the cost of stumpage, logging supplies, and logging wages, but the principal product from these

expenditures, namely, saw logs for use in the establishment conducting the operations, was not treated as a product of logging, but as material for the mill, logging of this character being regarded as an adjunct to mill operations. At the present census data relating to the logging branch of the industry were collected under the various headings with the same degree of care as that with which the mill operations were reported. Much of the expense that formerly was reported under the head of cost of materials, such as the amount paid for contract logging and, in some instances, the wages of men employed directly in work connected with logging, is now shown under "miscellaneous expenses" and "wages." As a result, the total cost of materials has decreased as compared with the value of products manufactured therefrom, while the items of wages and miscellaneous expenses have increased correspondingly. At former censuses the value of that part of the product of lumber mills which was dressed or remanufactured in planing mills connected with the sawmills producing it entered twice into the total value of the products of the industry—first as rough lumber and again in its finished form. There was also a similar duplication in the total cost of materials for the industry. The schedule for lumber mills was so framed at the census of 1905 as to avoid these duplications, in consequence of which both the cost of materials and the value of products are relatively smaller at the present census than at other censuses.

A similar change was made in the method of presenting the statistics for capital for turpentine and rosin. The value of orchard lands owned was included in capital in 1900, but excluded in 1905. The wages of the wage-earners engaged in gathering the crude material in the orchards and the miscellaneous expenses of the orchard work were included in wages and in miscellaneous expenses, respectively, at both censuses.

Presentation of statistics.—The method of presenting the statistics is similar to that followed at the Twelfth Census, but there are some differences which may be summarized as follows:

1. The totals for all industries and for each industry in the United States, for all industries and for selected industries in the states and territories, and for all industries in the principal cities, have been grouped so as to bring together the statistics for establishments with products valued at less than \$5,000, \$5,000 but less than \$20,000, \$20,000 but less than \$100,000, \$100,000 but less than \$1,000,000, and \$1,000,000 and over. This arrangement indicates very definitely the extent to which the large establishments predominated in certain industries and in certain sections of the country.

2. The totals for all industries and for selected industries have also been grouped according to the character of ownership of the establishments. This grouping shows the relative importance of the establishments controlled by individuals, private companies, and incorporated companies in the different industries, states, and cities.

3. Urban manufactures have been confined to municipalities having a population of 8,000 and over according to the census of 1900, and in the reports by states the urban and rural totals are presented in a comparative table for 1900 and 1905, with percentages showing the extent of the changes.

4. At the Twelfth Census the greatest and the least number of salaried officials and clerks employed at any one time during the year were reported. The greatest number was accepted as the number to be tabulated. The schedule for the census of 1905 called only for the "number" of this class of employees. As a rule there is very little variation in the number of salaried officials and clerks employed at different times, therefore it is probable that the greatest number does not differ much from the usual number, and the change in the schedule has had but slight, if any, effect on the totals.

5. The statistics concerning wage-earners and wages include a transcript of the pay roll for a representative week during which the largest number of persons were employed. The wage-earners were grouped according to actual weekly earnings. The figures used in the presentations on this subject are only for establishments from which the copy of a pay roll or satisfactory information could be secured. The report embodying these statistics is not included in this volume, but will be published later separately.

6. The schedule for the census of 1900 called for information regarding the months the establishments were in operation on full time, on three-fourths time, on half time, and on one-fourth time, and also the months they were idle, while the schedule for the census of 1905 asked for the "number of days in operation during the year, number of hours per day (under normal conditions), number of hours per week (under normal conditions)," and "extra time during the year, total number of hours."

7. A special showing is made in the reports, by states and territories, of the kind and horsepower of power used in the leading industries in 1905 as compared with 1900; and also of the number of men, women, and children employed, by months, and the greatest and least number of all wage-earners for the year. In most instances these reports by states also contain comparative tables of the leading industries, illustrating in detail their condition at this census as compared with their condition in 1900.

8. The inquiry concerning the date when the establishment commenced operations was omitted from the schedule of 1905, because the answers to this inquiry

at the census of 1900 were very unsatisfactory. A large proportion of the establishments have changed ownership a number of times, and the present owners can not give the date of the beginning of operations.

9. The presentation of county totals made at prior censuses has been abandoned. This was necessary because in many counties there were so few factories that the operations of individual establishments could be identified if the totals were published. The inclusion of the hand trades and neighborhood industries at former censuses caused the number of establishments to be so large that the county presentation was possible.

COOPERATION WITH STATE STATISTICAL OFFICES.

As stated in the Report on Manufactures, Twelfth Census, collaboration in Federal and state statistical work is desirable, because it tends to uniformity in results and to the elimination of the duplication of inquiries.

From an examination of the laws under which the statistical offices in a number of the states are organized, of the schedules used in the collection of the statistics, and of the published reports, it appears: First, that in addition to other lines of investigation the state offices collect information concerning manufactures and labor and wages, and that the schedules used in collecting these statistics are in many respects similar to those used by the Federal Government in taking the census of manufactures. Second, that the most noticeable and extensive duplications in statistical work occur when the Federal Government takes a general census and the states are engaged in either a general or a partial census of the same nature and covering the same period. Third, that while the schedules used in the different states are apparently designed to develop the same general facts and are similar, they differ in certain important details.

Of the prerequisites for the unification of statistical work, the adoption of a uniform schedule is probably the most important. It certainly lies at the base of uniformity in results. Not only this, but it tends to acquaint manufacturers with the class of information they will be required to furnish from time to time to both Federal and state officials, and it is reasonable to suppose that they will be better prepared to supply it when called upon.¹ Recognizing the desirability of coordinating the schedules, the Bureau of the Census consulted the state bureaus in regard to the inquiries for the census of 1905, and it was tentatively agreed by the officials of the majority that the schedule formulated as the result of this consultation should be used for all inquiries on the general subject of manufactures.

In furtherance of the scheme of cooperation, the

¹ Twentieth Annual Convention of the Association of Officials of Bureaus of Labor Statistics of America, Concord, N. H., July 12, 1904.

Federal Office worked as far as possible in collaboration with the statistical offices of the states in which a census of manufactures was taken under authority of the state laws. It was with this end in view that the law of March 1, 1904, was enacted by Congress providing:

That the Director of the Census is hereby authorized and empowered to cooperate with the secretary of state of the State of Michigan in taking the census of manufactures and shall equitably share the expenses thereof, the results of which may be accepted by the United States as its census of manufactures for that state for the year nineteen hundred and five: *Provided*, That the expenditures incident to this cooperation shall not exceed twenty thousand dollars, such expenditures to be paid from the fund appropriated for the expenses of the field work of the census for the fiscal year ending June thirtieth, nineteen hundred and five. And the Director of the Census may, in his discretion, cooperate with the officials of other States which take a like census in so far as it may aid in the collection of statistics of manufactures required by existing law.

As previously mentioned, the state census of Michigan was taken in conformity with the state law of June 7, 1901. The Federal and state agents worked together in collecting reports; the results were compiled by the Bureau of the Census and published in the form of a bulletin, copies being placed at the disposal of the state officials.

Enabling legislation was also enacted by the legislature of Massachusetts. The act providing for taking the decennial census of the commonwealth, approved June 4, 1904, contains the following provision:

The government of the United States having provided that the United States census office may cooperate with the statistical bureaus in the several states, the United States census office to bear the expense of the field-work in gathering statistics of manufactures, the chief of the bureau of statistics of labor is hereby authorized to contract with the director of the United States census for the rendering of such service, the contract to be subject to the approval of the governor and council. In case the gathering of the statistics of manufactures by the United States should cover the calendar year nineteen hundred and four instead of the year nineteen hundred and five, as hereinbefore provided, the statistics of manufactures shall be taken as for the time provided in the contract made with the director of the census.

Under authority of this law and the act of Congress referred to, the chief and the chief clerk of the bureau of statistics of labor of Massachusetts were appointed special agents of the Bureau of the Census and had supervision of the canvass which was made by local special agents. Of these agents, two-thirds were appointed and paid by the Bureau of the Census and one-third by the bureau of statistics of labor, which also allowed the use of its office and facilities without expense to the Federal Government. As in the case of Michigan, the schedules were forwarded to the Bureau of the Census, where the tabulations were made and the results furnished the state bureau.

The following joint resolution of the legislature of the state of Iowa, in which a census of the population is taken and certain other statistics collected every tenth year, permitted collaboration in making a census of manufactures of that state:

Be it resolved by the General Assembly of the State of Iowa:

That whereas, the acts of Congress of the United States approved March 3, 1899, and March 6, 1902, respectively, provide, that in the

year 1900, and every ten years thereafter, and also in the year 1905, and every ten years thereafter, there shall be a collection of the statistics of manufactures; and whereas, the collection of the statistics referred to in said acts extends to and includes the state of Iowa; therefore, the commissioner of the bureau of labor statistics, be, and he is hereby, authorized and instructed to cooperate with the Bureau of the Census of the United States in the collection of said statistics, and assist in every manner possible, either in his capacity as commissioner or otherwise, in making said collection a thorough enumeration of the manufacturing industries of this state. And the said commissioner of the bureau of labor statistics is hereby authorized and directed to make any change or modification of the schedules or methods of tabulation now used by him, or in the periods covered by his biennial reports, and the dates of their publication, which this resolution may make necessary.

It was found practicable for the regular employees of the Bureau of the Census and a few local agents to canvass the state without the assistance of state agents, and therefore cooperation with the state officials in the fieldwork was not necessary. The results, however, were placed at the disposal of the state office at the earliest practicable date and were published in the state census volume and in the report of the bureau of labor statistics.

In some states the officials had contemplated a census of manufactures, but abandoned the project and accepted the results of the Federal census.

In addition to collaboration between the Federal and state governments in the preparation of the schedules and cooperation in the enumeration, some of the state bureaus furnished the Federal Office with copies of their lists of manufacturing establishments, which were of great assistance in perfecting the lists for the entire country. On the other hand, after the completion of the canvass, the Federal Office furnished these bureaus with copies of the completed lists as corrected by the field agents.

The Federal Office made a special tabulation of certain data desired by the officials of some of the states, and supplied them with detailed information of the Federal reports which they published in advance. One of the state bureaus obtained from the manufacturers authority permitting the Federal Bureau to furnish it copies of the schedules. This enabled the state bureau to add more details to its files than had ever been possible under the application of state laws. In all cases where it was desired the state bureaus were furnished with advanced copies of the reports of the Federal census, to be used in their annual reports as they deemed advisable.

LIMITATIONS OF CENSUS STATISTICS.

The primary object of the census is to show the extent of the manufactures in the country, the states, the minor civil divisions, and the industries. This is accomplished by obtaining from each manufacturing establishment information concerning the amount of capital invested, the number of persons employed, the amount paid in wages, the miscellaneous expenses, the cost of materials used, the value of products, etc. Incidental to the collection of the general data, de-

tailed information was obtained concerning the horsepower used, the time the establishments were in operation, and the weekly earnings of wage-earners, and for some of the more important industries, statistics were secured showing the quantity and value of the different materials used and the products manufactured.

Although certain limitations are necessarily placed upon the use of the statistics, the figures can be accepted as indicating the growth and relative importance of the states, cities, and different sections of the country in manufactures, and also the growth and relative importance of the different industries in the country as a whole and in political and civil subdivisions. The statistics have these principal limitations:

1. They relate to all establishments that were in operation during any portion of the year ending December 31, 1904, and do not, therefore, represent a full year's operation for every establishment. Moreover, establishments were allowed to make reports for the business year which most nearly conformed to the census year, so that even when a full year is covered it is not always the calendar year.

2. They do not furnish complete information concerning the possible or relative advantages of manufacturing in the different sections of the country, or in one industry as compared with another.

3. They do not disclose the profits of manufacture nor the exact relation of the cost of manufacture to the value of products. The census inquiry was designed to obtain a statement of the important items which constitute the great part of the cost of manufacturing, but there are many other expenses which were not taken into consideration, such as depreciation of plant, interest on capital owned, and losses by bad debts.

4. They can not be used to compute the true average amount of capital required in practice to produce a given product, because of the differing elements in capital and in value of products.

5. They can not be used to compute the average annual earnings except for an artificial unit and in the manner shown in the section on "average annual earnings" in Chapter V, where the limitations are fully discussed.

6. They can not be used to compute the average value of products per wage-earner, because of the uncertainties that have attended the computation of the average number of wage-earners employed during the year and the differences in the methods that have been used in returning the value of products.

Averages.—All averages are in a sense fictitious. They can never wholly take the place of facts, but they have a value and are sometimes very practical, in that they serve a specific purpose. The mind, for certain purposes, must be assisted in reaching a conclusion, and an average furnishes this assistance. In census statistics, as elsewhere, the average is never the actual experience of any establishment; it represents a composite establishment, resembling the actual establishments as

much as, and no more than, a composite photograph of persons resembles the various individuals which it represents. The average is helpful when computed from the best elements that can be obtained, when it serves a purpose of information or comparison, and when it is properly employed in a proper field. If its foundation is deficient, this should be strengthened; if this is difficult from the nature of the work, as in a general census, the difficulty should be plainly stated, and if averages are computed their limitations should be clearly presented.¹

Certain census averages, such as the average amount of capital required for a product of a given value and the average value of products per wage-earner, have been presented in Census reports, but have been accompanied with a statement of the limitations that attach to them and cautions to the public against their unqualified use. Notwithstanding these expressed limitations and cautions, the averages have frequently been used without qualification by writers and others to confirm their conclusions. Other Census data have been used as the basis of computations showing alleged net profits of manufacturers, and the percentages of the gross and net products to be assigned to capital and to labor, respectively, and also in attempting to establish or to refute various other economic postulates.

It is impossible at a general census of all manufactures to collect from every establishment sufficiently exact figures concerning income and expenses to justify their use for the purposes indicated. In many instances manufacturing is carried on in connection with mining, transportation, a mercantile business, or some other industry, and the expenses and income of the entire business are so blended that an exact segregation of the figures for manufactures can not be made. Many establishments do not keep book accounts in such a way that all of the Census data can be secured, and there were in 1905 many reports for which it was necessary to make more or less careful estimates for some parts. These estimates were, in the majority of instances, prepared by the proprietors or other persons in authority who were familiar with the operations of the establishments during the census year, and they are sufficiently exact to justify their inclusion in an aggregate to show the magnitude and relative importance of the different industries and of all industries in the different states.

¹ The mean is a single fictitious value substituted for a plurality of actual values. It stands to reason, therefore, that the former can not take the place of the latter for general purposes any more than the center of gravity can for purposes in general take the place of the system of material points to which it corresponds.—Dr. John Venn, D. Sc., F. R. S., "On the Nature and Use of Averages," *Journal of the Royal Statistical Society*, Vol. LIV, page 432.

The mean of statistics is a description, a representative quantity put for a whole group, the best representative of the group; that quantity which, if we must in practice put one quantity for many, minimizes the error unavoidably attending such practice * * * statistics are different originals affording one "generic portrait."—Mr. Edgeworth on "The Theory of Errors of Observation and the First Principles of Statistics," *Cambridge Philosophical Society, Transactions*, Vol. XIV, pages 139 and 140.

The only practical method of obtaining statistics to be used in making calculations, such as those for net profits and percentages of product assigned to labor and capital, is to confine the canvass to the enumeration of a comparatively few typical factories where good systems of bookkeeping are followed and for which complete information on uniform lines can be secured.

Relation of capital to product.—The limitations and defects of the statistics of capital are explained on page lxiv. Except for a few industries the total does not include the value of rented land and buildings. Therefore two establishments having an annual product of about the same value might report widely divergent amounts as capital, because one manufacturer owned the land, buildings, and machinery, and included their value in the capital reported to the Census, while the other rented equally valuable land, buildings, and machinery, and did not include their value in the capital reported. A computation of the average amount of capital required for a product of a given value based on a combination of the reports for these two establishments would have no significance, because it would not be an indication of the average conditions prevailing in either class of establishments. To make the statistics for these establishments uniform, the capital represented by the rent paid should be included in the total capital. The totals for the United States show \$73,267,209 as paid by manufacturers for rent of land, buildings, and machinery during the year. If the value of the property represented by this expense were included in the capital, the total would indicate more nearly the correct amount of capital invested in manufactures.

Another reason why the amount of capital required for a product of a given value can not be calculated from the Census statistics is found in the fact that the value of products does not represent an output for the same period of time for all establishments. Many establishments were in active operation during only a portion of the year, while the majority were in operation during the entire period of twelve months. Therefore two establishments with practically the same capital might report a widely divergent proportion of product, because one was in operation a few weeks and the other the entire year. A computation based on the combination of such reports would have no economic value. The difference in the methods of reporting the value of products is a further reason for not using the value to compute averages of this character. Some establishments report the selling value, while others report the value at the factory, and others the factory cost.¹

For further explanation of the limitations upon the use of Census statistics reference should be made to Part I of the Report on Manufactures Twelfth Census.

COMPARISON WITH PRIOR CENSUSES.

The measurement of growth is one of the most important uses that can be made of the statistics of manufactures, and when possible the figures have been presented in comparative tables which embrace data reported at previous censuses. Unfortunately it has been necessary to place certain restrictions on the application of the data presented at the various censuses. A full explanation is given of these restrictions in the analysis of the statistics for the Twelfth Census,² and, as the schedule for the census of 1905 was in all important particulars a duplicate of the one used at the former census, it is not necessary to repeat the explanations.

Naturally the statistics presented at the census of 1900 and the statistics of 1905 are not comparable, for the former covered all kinds of manufacturing and mechanical establishments, while the latter were limited to manufacturing establishments conducted under what is known as the factory system. It has therefore been necessary to reduce the totals for 1900 to a comparative basis by excluding the figures for establishments and industries of the classes omitted in 1905. This revision of the statistics has made necessary a great deal of work. For example, to prepare comparative totals for flour and grist mills and for lumber mills, it has been necessary to examine all of the reports for the Twelfth Census and make a new tabulation, omitting the reports for all mills engaged exclusively in custom grinding or in custom sawing, unless the quantity of products reached a million feet. Such a tabulation could not be made for earlier censuses, as the schedules for some of them are not available and those for others do not contain an inquiry that would develop the fact that the establishments were custom mills. For the industries in which all of the establishments are of the character necessarily included in a factory census, comparison can be made with the census of 1900 and with prior censuses.

In Table 1, which presents a comparison for the industries at each census from 1880 to 1905, the mechanical trades have been omitted and the totals for 1900 have been revised, by omitting establishments such as the custom grist and saw mills, so as to make the figures more nearly comparable with those for 1905; but for 1880 and 1890 the totals for these and other neighborhood industries, reported as a part of factory classifications, have been reproduced as printed, and consequently the comparison is not exact. As explained on page xxxv, the defect consists principally in the number of establishments.

Changes in the inquiries of the schedules for different censuses affect the comparisons and should be considered. Statistics concerning live capital—that

¹ See page cvii.

² Twelfth Census, Manufactures, Part I, page lxi.

is, cash on hand, bills receivable, unsettled ledger accounts, raw materials, stock in process of manufacture, finished products on hand, and other sundries—were first called for at the census of 1890.

At the census of 1890 the number and salaries of proprietors and firm members actively engaged in the business or in supervision were reported and combined with the corresponding items for clerks and other officials. In cases where proprietors and firm members were reported without salaries, the amount that would ordinarily be paid for similar services was estimated. At the censuses of 1900 and 1905 the number of proprietors and firm members actively engaged in the industry or in supervision was ascertained, but no salaries were reported for this class. It is therefore impossible to compare the number and salaries of salaried officials of any character except for the last two censuses.

Furthermore, the schedules for 1890 included in the wage-earning class, overseers, foremen, and superintendents (not general superintendents or managers), while the censuses of 1900 and 1905 separated from

the wage-earners such salaried employees as general superintendents, clerks, and salesmen. It is possible and probable that this change in the form of the question has resulted in eliminating from this class at the censuses of 1900 and 1905 many high-salaried employees included in that group at the census of 1890.

The inquiries relating to employees and wages were changed in 1900, in order to eliminate defects found to exist in the form of inquiry adopted in 1890. At the census of 1890 the average number of persons employed during the entire year was called for, and also the average number employed at stated weekly rates of pay, and the average number was computed for the actual time the establishments were reported as being in operation. At the censuses of 1900 and 1905 the greatest and least numbers of employees were reported, and also the average number employed during each month of the year. The average number of wage-earners (men, women, and children) employed during the entire year was ascertained by using 12, the number of calendar months, as a divisor into the total of the average numbers reported for each month.

CHAPTER II.

SUMMARY OF RESULTS.

FACTORY INDUSTRIES.

As previously explained, the census of 1905 is the first Federal census of manufactures that has been confined to establishments conducted under what is known as the factory system. In the revision of the statistics for 1900 to make them comparable with those for the census of 1905 it was necessary to omit wholly the data for establishments comprising the group of "hand trades," and to eliminate the statistics for establishments such as the custom grist and saw mills, which were engaged exclusively in neighborhood production, although formerly the statistics for them and the factories producing the same products were combined.

Of the 512,254 establishments included in the reports of the census of 1900, the statistics for 304,692

have been eliminated. While the number of establishments thus deducted formed 59.5 per cent of the total number reported, the number of wage-earners employed in them formed only 11.2 per cent of all the wage-earners, and the value of products, only 12.3 per cent of the value reported for all establishments, which the other items formed unimportant proportions of the corresponding totals. Therefore the exclusion of the reports for these establishments has very slight effect on the statistics, except to decrease the number of establishments.

The direct comparisons, so far as the totals for all industries are concerned, are confined to the censuses of 1900 and 1905 and show the increase in the factory industries of the country for the period of about four and a half years. The results are summarized in the following comparative table:

TABLE I.—COMPARATIVE SUMMARY, URBAN AND RURAL: 1905 AND 1900.

	TOTAL.			URBAN. ¹			RURAL.		
	1905	1900	Per cent of increase.	1905	1900	Per cent of increase.	1905	1900	Per cent of increase.
Number of establishments.....	210,202	207,562	4.2	113,101	106,513	6.2	103,161	101,049	2.1
Capital.....	\$12,686,205,673	\$8,978,826,200	41.3	\$8,560,221,283	\$6,382,432,475	34.2	\$4,120,044,390	\$2,596,392,725	58.7
Salaried officials, clerks, etc., number.....	519,751	364,202	42.7	386,713	280,322	38.0	133,038	83,880	58.6
Salaries.....	\$574,761,231	\$380,889,091	50.9	\$438,685,154	\$301,509,265	45.5	\$136,076,077	\$79,379,826	71.4
Wage-earners, average number.....	5,470,321	4,715,023	16.0	3,024,829	3,154,911	14.9	1,845,492	1,560,112	18.3
Total wages.....	\$2,611,540,532	\$2,009,735,799	29.9	\$1,796,277,612	\$1,417,123,370	26.8	\$815,262,420	\$592,612,429	37.6
Men 16 years and over.....	4,244,538	3,635,236	16.8	2,680,883	2,325,080	15.7	1,554,655	1,310,150	18.7
Wages.....	\$2,266,273,317	\$1,730,347,184	30.5	\$1,521,141,741	\$1,190,990,707	27.1	\$745,131,576	\$530,385,477	38.1
Women 16 years and over.....	1,065,884	918,511	16.0	836,836	731,101	14.5	229,048	187,410	22.2
Wages.....	\$317,279,008	\$248,814,074	27.5	\$256,932,754	\$203,806,579	26.1	\$60,346,254	\$45,007,495	34.1
Children under 16 years.....	159,899	161,276	0.9	98,110	98,724	0.6	61,789	62,552	1.2
Wages.....	\$27,988,207	\$24,574,541	13.9	\$18,203,117	\$16,356,084	11.3	\$9,785,090	\$8,218,457	19.1
Miscellaneous expenses.....	\$1,455,019,473	\$905,600,225	60.7	\$1,110,261,278	\$722,208,983	53.7	\$344,758,195	\$183,301,242	88.1
Cost of materials used.....	\$8,503,949,756	\$6,577,614,074	29.3	\$5,849,805,532	\$4,656,459,784	25.6	\$2,654,144,224	\$1,921,154,290	38.2
Value of products, including custom work and repairing.....	\$14,802,147,087	\$11,411,121,122	29.7	\$10,310,285,063	\$8,141,364,055	26.6	\$4,491,862,024	\$3,269,757,067	37.4

¹ Includes municipalities having a population in 1900 of at least 8,000.

² Decrease.

As compared with the totals for the fiscal year ending May 31, 1900, the factory industries of the country during the calendar year 1904 increased 8,700, or 4.2 per cent, in the number of establishments; \$3,707,440,473, or 41.3 per cent, in the capital invested; 755,298, or 16 per cent, in the number of wage-earners employed; \$601,804,733, or 29.9 per cent, in the amount paid as wages; and \$3,391,025,965, or 29.7 per cent, in the value of products. The value of products given in this and all other tables, unless otherwise specified, is the gross value and contains the duplications and uncertainties referred to in the discussion of products.¹

¹ See pages cvii and cviii.

Since 1900 there has been an increase in the manufactures of the country as a whole. The capital invested, number of persons employed, wages paid, and value of products have been in excess of those for the preceding census year. Between 1900 and 1905 there were short periods of depression for some industries, but there was no period of general industrial depression. Such depressions have occurred during most of the preceding intercensal periods, and comparison has shown the result of gains after the depression, rather than the accumulation of constant increases. Therefore, while each census has indicated a gain in the magnitude of the manufactures of the country, the showing

may have been due, to some extent at least, to the fact that each census covered a prosperous business year.

Since the census of 1905 is the first quinquennial census, there are no statistics on which to base comparisons of increase for the same period of time. The enumeration at periods of five years will lead to a truer average of the increase or decrease for a cycle of years of the factory industries than would be possible if the ten-year period were continued.

It is impossible to correct the totals published at censuses prior to 1900 for all manufacturing and mechanical industries so that they will be comparable with the totals for the factory industries of 1905. It is essential, however, to present statistics indicative of the increase in the manufactures of the country for earlier years, and this is done in Table 1, which shows the total for each specified industry for each census from 1880 to 1905. For the well-defined factory industries, such as the textiles, boots and shoes, glass, and iron and steel, the comparison is as satisfactory for the earlier censuses as for the censuses of 1900 and 1905; but for some industries, such as the manufacture of flour and grist mill products, lumber and timber products, and harness and saddlery, the comparison is not exact, because the totals for the censuses prior to 1900 include reports for the small custom mills and neighborhood shops, which are excluded from the totals for 1900 and 1905.

FACTORY, NEIGHBORHOOD, AND MECHANICAL INDUSTRIES.

The exclusion of the establishments engaged in the neighborhood and mechanical industries from the statistics for 1905 makes it impossible to supply comparative data for the total of all industries reported at prior censuses unless the statistics for the neighborhood and mechanical industries are estimated. There are several methods that could be followed in making this estimate, but two are direct and easy of application. Except as to the number of establishments it may be assumed that since 1900 the neighborhood and mechanical industries have increased at the same ratio as all industries during the decade ending with that year, or that these industries have increased at the same ratio as the factory industries since 1900. There is a certain interdependence of the factory and the neighborhood and mechanical industries, and it is fair to assume that the increase of the factory industries since 1900 is a better indication of the conditions that have prevailed in the neighborhood and mechanical industries during this period than could be gathered from the increase during the ten years preceding. Therefore the totals for the neighborhood and mechanical industries for 1905, which are included in the following comparative table, have been estimated by the application of the corresponding percentages shown in Table 1 for the factory industries:

TABLE II.—COMPARATIVE SUMMARY OF ALL INDUSTRIES—FACTORY, MECHANICAL, AND NEIGHBORHOOD—WITH PER CENT OF INCREASE FOR EACH CENSUS PERIOD: 1860 TO 1905.

[Figures for mechanical and neighborhood industries, 1905, are estimates based on percentages of increase over 1900 shown for factory industries, Table I.]

	CENSUS.						PER CENT OF INCREASE.				
	1905 ¹	1900 ¹	1890	1880	1870	1860	1900 to 1905	1890 to 1900	1880 to 1890	1870 to 1880	1860 to 1870
Number of establishments.....	533,760	512,254	355,415	253,852	252,148	140,433	4.2	44.1	40.0	0.7	79.6
Capital.....	\$13,872,035,371	\$9,817,434,799	\$6,525,150,480	\$2,790,272,006	\$2,118,208,709	\$1,009,855,715	41.3	50.5	133.9	31.7	109.8
Salaried officials, clerks, etc., number.....	566,175	396,759	246,000	(3)	(3)	(3)	42.7	13.9	.....	.....	.....
Salaries.....	\$609,200,251	\$403,711,233	\$239,988,208	(3)	(3)	(3)	50.9	3.0	.....	.....	.....
Wage-earners, average number.....	6,157,751	5,308,406	4,251,013	2,732,595	2,053,996	1,311,246	16.0	24.9	55.6	33.0	50.6
Total wages.....	\$3,016,711,706	\$2,322,333,877	\$1,891,228,321	\$947,953,795	\$775,584,343	\$378,878,966	29.9	22.8	99.5	22.2	104.7
Men 16 years and over.....	4,801,096	4,110,527	3,327,042	2,019,035	1,615,598	1,040,349	16.8	23.5	64.8	25.0	55.3
Wages.....	\$2,631,764,515	\$2,016,677,789	\$1,659,234,483	(3)	(3)	(3)	30.5	21.5	.....	.....	.....
Women 16 years and over.....	1,194,083	1,020,206	803,686	531,639	323,770	270,897	16.0	28.1	51.2	64.2	19.5
Wages.....	\$356,992,855	\$279,994,390	\$215,367,976	(3)	(3)	(3)	27.5	30.0	.....	.....	.....
Children under 16 years.....	107,066	108,583	120,885	181,921	114,628	(3)	40.9	39.5	33.6	58.7	.....
Wages.....	\$29,228,667	\$25,661,692	\$16,625,862	(3)	(3)	(3)	13.9	54.3	.....	.....	.....
Miscellaneous expenses.....	\$1,051,603,535	\$1,027,755,778	\$631,225,035	(3)	(3)	(3)	60.7	62.8	.....	.....	.....
Cost of materials used.....	\$9,497,619,851	\$7,345,413,651	\$5,102,044,076	\$3,396,823,540	\$2,488,427,242	\$1,031,605,002	29.3	42.3	32.0	36.5	141.2
Value of products, including custom work and repairing.....	\$16,866,706,985	\$13,004,400,143	\$9,372,437,283	\$5,369,579,191	\$4,232,325,442	\$1,885,861,676	20.7	38.8	74.5	26.9	124.4

¹ Totals for 1900 and 1905 are exclusive of statistics for governmental establishments and for Hawaii.

² Includes proprietors and firm members, with their salaries; number only reported in 1900 and 1905, but not included in this table.

³ Not reported separately.

⁴ Decrease.

⁵ Not reported.

Although the schedules of inquiry used at the censuses of 1900 and 1905 were practically identical, certain changes made in the schedules used at the censuses of 1900 and 1890 affect the comparison with prior censuses, as shown in Chapter I.

As explained in the introduction to Part I of the Twelfth Census Report on Manufactures, the statistics

for each census must be accepted with many qualifications. To these qualifications must be added the possibility of under or over estimating the importance of the neighborhood and mechanical industries for the census of 1905. Establishments with an annual product of less than \$500, and manufacturing operations carried on by governmental, educational, eleemosynary,

and penal institutions, have been excluded from all totals for the census of 1905.

The increase in manufactures up to 1900 is treated in the reports of the Twelfth Census, a general survey being given in Manufactures, Part I. The short period between the censuses of 1900 and 1905 was characterized not only by an increase in manufactures as a whole, but by the development of some new, and the great expansion of some of the older industries, also by the decrease in certain lines of manufacture and a change in the geographic center of others. These facts are developed in the following discussion, and also in the reports on the manufactures of the different states given in Part II and on selected industries.

CONDENSED STATEMENT.

There were 207,562 establishments engaged in manufactures in 1900 and 216,262 establishments at the census of 1905, a net increase of 8,700, or 4.2 per cent. The greatest increase in number occurred in the manufacture of bread and other bakery products, and the greatest decrease, in the manufacture of lumber and timber products.

The extent to which manufactures were controlled by large establishments is shown by the fact that although the 24,181 establishments reported with products valued at \$100,000 and over formed but 11.2 per cent of the total number, they controlled 81.5 per cent of the capital, employed 71.6 per cent of the wage-earners, and produced 79.3 per cent of the value of products. All establishments reported in the following industries had products valued at \$100,000 and over: Belting and hose, rubber; glucose; locomotives; smelting and refining, zinc.

Of the total number of establishments reported at the census of 1905, 113,101, or 52.3 per cent, were located in municipalities with a population of 8,000 and over, according to the census of 1900. These urban establishments reported 3,624,829 wage-earners, or 66.3 per cent of the total number employed, and products valued at \$10,310,285,063, or 69.7 per cent of the total value of all products. At the census of 1900, 106,513 establishments, or 51.3 per cent of the total number enumerated, were located in these urban centers, and they gave employment to 3,154,911 wage-earners, or 66.9 per cent of the total number employed, and reported products valued at \$8,141,364,055, or 71.3 per cent of the value of all products.

Of the 216,262 establishments reporting for the United States, 19,679, or 9.1 per cent, reported no wage-earners; 76,193, or 35.2 per cent, reported less than 5; 67,577, or 31.2 per cent, from 5 to 20; and 26,492, or 12.2 per cent, from 21 to 50. The number reporting from 501 to 1,000 wage-earners was 1,237, or six-tenths of 1 per cent; while only 536, or two-tenths of 1 per cent, reported over 1,000. The industry show-

ing the largest number of establishments having under 5 wage-earners was bread and other bakery products, and that showing the largest number having over 1,000 wage-earners was cotton goods.

The number of establishments under each form of ownership in 1905 and the proportion the number forms of the whole number tabulated are as follows: Individual, 113,961 establishments, or 52.7 per cent of the whole number; firm, 47,942, or 22.2 per cent; incorporated company, 51,156, or 23.6 per cent; and miscellaneous, 3,203, or 1.5 per cent.

At the census of 1905 the value of the manufactured products reported by incorporated companies was \$10,912,080,421, or 73.7 per cent of the total; \$2,132,619,830, or 14.4 per cent, was reported for firms; \$1,702,980,808, or 11.5 per cent, for individuals; and \$54,466,028, or only four-tenths of 1 per cent, for establishments in the miscellaneous class of ownership.

The \$12,686,265,673 shown as the amount of capital invested in manufacturing industries in 1905 is an increase of \$3,707,440,473, or 41.3 per cent, over that reported in 1900.

There were 225,704 proprietors and firm members reported at the census of 1905, and the salaried employees and wage-earners numbered 5,990,072. The total salaries and wages paid during the census year amounted to \$3,186,301,763. The number of employees was 17.9 per cent and the salaries and wages, 33.3 per cent greater than the corresponding items for 1900.

Of the total number employed, as returned at the census of 1905, 519,751, or 8.7 per cent, were salaried employees, and they received salaries amounting to \$574,761,231, or 18 per cent of the total paid all employees. In 1900 the salaried employees formed 7.2 per cent of the total number of employees and received 15.9 per cent of the total salaries and wages. The increases in 1905 over 1900 were 42.7 per cent in the number of salaried persons employed and 50.9 per cent in the amount of money paid them. Of the total amount reported at the census of 1905 as expended in salaries, 93.5 per cent was paid to men including the officers of corporations for which a few women were reported, and 6.5 per cent, to women.

The average number of wage-earners employed during the entire year increased from 4,715,023 at the census of 1900 to 5,470,321 at the census of 1905. Of the number for 1905, 3,624,829, or 66.3 per cent, were employed in urban and 1,845,492, or 33.7 per cent, in rural districts, the corresponding percentages for 1900 being 66.9 and 33.1. The increase for the urban districts was 469,918, or 14.9 per cent, and that for the rural, 285,380, or 18.3 per cent.

The manufacture of lumber and timber products gave employment to the largest average number of wage-earners and whalebone cutting, to the smallest.

The following five industries each employed over 200,000 wage-earners:

INDUSTRY.	Average number of wage-earners.
Lumber and timber products.....	404,626
Foundry and machine shops (including locomotives and stoves and furnaces).....	402,914
Cotton goods (including cotton small wares).....	315,874
Cars and general shop construction and repairs by steam railroad companies.....	236,900
Iron and steel, steel works and rolling mills.....	207,562

The greatest number of wage-earners employed at any one time during the year was 7,017,138 and the least, 4,599,091. The four leading states, in the order of their importance as to the greatest number of wage-earners employed at any one time were: New York, with 1,075,570; Pennsylvania, with 924,685; Massachusetts, with 578,208; and Illinois, with 478,488.

Of the total number of wage-earners for all industries in the United States, 4,244,538, or 77.6 per cent, were men; 1,065,884, or 19.5 per cent, were women; and 159,899, or 2.9 per cent, were children under 16 years of age.

Men were employed in all of the industries. The average number increased from 3,635,236 at the census of 1900 to 4,244,538 at the census of 1905, the increase being 609,302, or 16.8 per cent. The greatest increase is shown for the industry "cars and general shop construction and repairs by steam railroad companies." The largest average number by industries was reported for the manufacture of lumber and timber products; the largest average by months, for the month of October; and the largest average by states, for New York. Manufacturing establishments in urban districts reported 2,689,883, or 63.4 per cent, and those in rural districts, 1,554,655, or 36.6 per cent of the total number of men employed as wage-earners.

Women were reported for 315 industries. The average number increased from 918,511 at the census of 1900 to 1,065,884 at the census of 1905, the increase being 147,373, or 16 per cent. The greatest increase is shown for the manufacture of cigars and cigarettes.

Children were reported for 315 of the industries. The average number of children employed decreased from 161,276 in 1900 to 159,899 in 1905, the decrease being 1,377, or nine-tenths of 1 per cent. A decrease in the employment of children is shown for 25 states and territories and an increase for 26. The greatest decrease occurred in Illinois, which showed 9,943 children employed in 1900 and only 4,946 in 1905, a decrease of 4,997, or 50.3 per cent. The greatest increase is shown for the manufacture of cigars and cigarettes. The largest average number was reported for the state of Pennsylvania. The largest average number by industries was shown for the manufacture of cotton goods during the month of December. The

month of greatest average employment for children in all industries was September.

The total wages distributed among wage-earners during the census year 1900 was \$2,009,735,799, while the amount shown at the census of 1905 was \$2,611,540,532, an increase of \$601,804,733, or 29.9 per cent.

The proportion of the total wages paid men, women, and children at the census of 1900 was 86.4, 12.4, and 1.2 per cent, respectively, as compared with 86.8, 12.1, and 1.1 per cent at the census of 1905.

For the United States as a whole the three months constituting the busy season were September, October, and November. The average number employed per month during this period was 5,625,542, exceeding the average number for the entire year by 155,221.

Of the principal industries, the greatest variation in employment at different seasons of the year is shown for the canning industry, in which the average number of wage-earners ranged from 12,170 in February to 145,911 in September. The least variation is shown for the tanning and currying of leather, the highest average, 57,718, being for March, and the lowest, 56,121, for January.

Of the 216,262 establishments reporting, only 1,883 failed to return the number of days in operation. Those reporting from 301 to 330 days constituted the largest number—79,532, or 37.1 per cent of those reporting days in operation. The next largest number—67,492, or 31.5 per cent—reported from 271 to 300 days. The number in operation 30 days or less was 1,760, or eight-tenths of 1 per cent; while 6,104, or 2.8 per cent, operated from 331 to 366 days.

The total reported for miscellaneous expenses at the census of 1905 was \$1,455,019,473, an increase of \$549,419,248, or 60.7 per cent, over the total for 1900. This large increase is due in part to an increase in expenditures for advertising and to the inclusion of selling expenses which may not have been reported to such an extent in 1900.

The \$8,503,949,756 reported as cost of materials used during the year was composed of \$3,141,134,590 for materials used in the raw state, \$4,917,612,779 for partially manufactured materials, and \$445,202,387 for fuel, mill supplies, freight, etc. The aggregate cost for 1905 is an increase of \$1,926,335,682, or 29.3 per cent, over the total for 1900. The cost of materials used in the raw state increased 36.2 per cent; that of materials used in partially manufactured form, 26.4 per cent; and that of fuel, mill supplies, freight, etc., 17.1 per cent.

In a number of industries no raw materials whatever were reported as having been used, but in all industries partially manufactured materials were reported. The largest amount expended for raw materials was reported by establishments engaged in the manufacture of flour and grist mill products.

The primary sources of the raw materials ranked as follows, according to cost: From the farm, 79.4 per cent; from mines and quarries, 15 per cent; from the forest, 5.2 per cent; and from the sea, four-tenths of 1 per cent. At the census of 1900 the rank was: Farm, 81.2 per cent; mines and quarries, 13.4 per cent; forest, 5 per cent; and sea, four-tenths of 1 per cent. The greatest absolute increase of expenditure was in those industries depending upon the farm for their raw material and the greatest relative increase in those depending upon the mine.

The value of products reported at the census of 1900 was \$11,411,121,122 and the value at the census of 1905 was \$14,802,147,087, an increase of \$3,391,025,965, or 29.7 per cent. As the products of many factories become the materials in other manufactures, this value contains numerous duplications. Deducting these, represented by the \$4,980,941,700 reported as the cost of partially manufactured materials, including mill supplies, from the gross value of products, \$9,821,205,387 remains as the "net or true value." Deducting from this net value the cost of raw materials and adding the cost of mill supplies, the amount remaining—\$6,743,399,718—is the "value added to materials by manufacturing processes." This does not take into consideration the partially manufactured articles imported for use in manufactures.

Measured by the gross value of products, slaughtering and meat packing, wholesale, was the most important industry in the United States at the census of 1905; but the greatest absolute increase since 1900 is shown for the manufacture of flour and grist mill products.

According to the census of 1905, products valued at over a half billion dollars were manufactured in 5 industries, as follows: Slaughtering and meat packing, wholesale, \$801,757,137; foundry and machine shop products (including locomotives and stoves and furnaces), \$799,862,588; flour and grist mill products, \$713,033,395; iron and steel, steel works and rolling mills, \$673,965,026; and lumber and timber products, \$580,022,690. The manufacture of cotton goods (including cotton small wares) nearly reached the half billion mark, the products being valued at \$450,467,704. The products of these 6 industries formed 27.2 per cent of the value of products of all the industries reported at the census of 1905.

The group of industries classed as "food and kindred products" ranked first at the census of 1905, as at that of 1900, in number of establishments, cost of materials used, and gross value of products. At both censuses the group "iron and steel and their products" led in capital and wages paid, while textiles led in the average number of wage-earners employed.

Of 51 states and territories in the United States, four—New York, Pennsylvania, Illinois, and Massachusetts—manufactured products valued at over one billion dollars during the census year. Of these states, New York alone had the distinction of passing the two

billion mark, although Pennsylvania nearly reached this immense total. These states were the most important producers of manufactured commodities in 1900 also. The percentages for the 4 states for 1905 and 1900, respectively, were 39.9 and 40.8 for number of establishments, 45.5 and 45.9 for number of wage-earners, and 47.1 and 48.6 for value of products.

According to the census of 1905 the states east of the Mississippi river and north of Mason and Dixon's line and the Ohio river contained 65.5 per cent of the establishments in the United States, gave employment to 74.1 per cent of the number of wage-earners, and reported 73.3 per cent of the total value of products.

Of the highly localized principal industries, taking them in the order of greatest localization, the manufacture of silk and silk goods was centered in New Jersey, Pennsylvania, New York, and Connecticut. These 4 states produced 88.5 per cent of the value of such products, New Jersey leading with 32.2 per cent, and Pennsylvania following with 29.5 per cent.

Of the worsted goods, 86.9 per cent of the total value was reported from Massachusetts, Rhode Island, Pennsylvania, and New Jersey. Massachusetts led with 31.4 per cent, and Rhode Island was second with 26.8 per cent.

The products of blast furnaces were localized in Pennsylvania, Ohio, Illinois, and Alabama, the products of these states representing 82.9 per cent of the total for the United States. Pennsylvania was first with 46.4 per cent, and Ohio, second with 17.6 per cent.

Pennsylvania, Ohio, Illinois, and New York reported 82.6 per cent of the value of products of rolling mills and steel works, Pennsylvania leading with 54 per cent, and Ohio ranking second with 16.6 per cent.

Of the total value of glass products, 72.7 per cent was made in Pennsylvania, Indiana, Ohio, and New Jersey, the first named state producing 34.8 per cent, and the second, 18.5 per cent.

Massachusetts, New York, Ohio, and Missouri produced 70.9 per cent of the value of the boots and shoes manufactured, Massachusetts leading with 45.1 per cent, and New York following with 10.7 per cent.

Of hosiery and knit goods, 67.6 per cent of the total value of products was reported from New York, Pennsylvania, Massachusetts, and Connecticut, the proportion for New York being 33.8 per cent, and that for Pennsylvania, 22.5 per cent.

Slaughtering and meat packing, wholesale, was localized in Illinois, Kansas, Nebraska, and Missouri, 66.5 per cent of the value of products being returned from these states. Illinois was first with 38.6 per cent, and Kansas was second with 11.8 per cent.

Illinois led in the value of agricultural implements manufactured, with 34.3 per cent of the total value of products, New York being second with 11.6 per cent. These states and Ohio and Wisconsin showed 66.4 per cent of the total value of products for the United States.

Woolen goods to the value of 62.6 per cent of the total value were reported from Massachusetts, Pennsylvania, Maine, and Connecticut. Massachusetts led with 31.4 per cent, and Pennsylvania was second with 13.5 per cent.

Leather, tanned, curried, and finished, was reported from Pennsylvania, Massachusetts, Wisconsin, and New York, to the value of 59.5 per cent, Pennsylvania leading with 27.5 per cent, and Massachusetts ranking second with 13.2 per cent.

The 4 states in which the manufacture of cotton goods was most largely centered were Massachusetts, South Carolina, North Carolina, and Georgia. These states reported 59 per cent of the total value of products in the United States, Massachusetts having 29.2 per cent, and South Carolina, 11.2 per cent. Four Northern states—Massachusetts, Rhode Island, New Hampshire, and Pennsylvania—produced 48.2 per cent of the total value and 4 Southern states—South Carolina, North Carolina, Georgia, and Alabama—33.6.

New York, Massachusetts, Maine, and Wisconsin produced 58.6 per cent of the paper and wood pulp, the percentage for New York being 20 and that for Massachusetts, 17.

The aggregate motive power employed in manufacturing establishments in the United States at the census of 1905 amounted to 14,641,544 horsepower, an increase of 40.7 per cent over the 10,409,625 horsepower used in 1900. At the census of 1905 the 14,008,639 horsepower reported as owned was divided as follows: 127,425 steam engines, with 10,828,111 horsepower; 19,598 water wheels, with 1,642,035 horsepower; 1,398 water motors, with 5,934 horsepower; 73,120 electric motors, with 1,150,891 horsepower; 21,525 gas and gasoline engines, with 289,514 horsepower; and other kinds of power, with 92,154 horsepower. Power amounting to 632,905 horsepower, of which 441,592 was electric, was rented from other establishments.

CHAPTER III.

ESTABLISHMENTS AND CHARACTER OF OWNERSHIP.

ACTIVE ESTABLISHMENTS.

In the reports of the Twelfth Census the term "establishment" was defined as "representing one or more mills owned or controlled by one individual, firm, or corporation, located either in the same city or town, or in the same county, and engaged in the same industry."¹ If the mills were located in different counties or in different cities or towns, the canvass of which was withdrawn from enumerators and placed in the care of special agents, they were necessarily treated as separate establishments, because the statistics were published separately for these civil subdivisions.

The county presentation was abandoned at the census of 1905 and the statistics are published separately only for the different states and for municipalities having a population of 8,000 and over. Therefore only one report was required for plants operated under the same ownership, engaged in the same industry, and located in the same city, or outside the corporate limits of any city but in the same state or territory, and the data presented in such a consolidated report were accepted and counted as the statistics for a single establishment. But where the plants were engaged in different industries, as defined by the Census classifications, separate reports were required. A prominent instance of this segregation is the separate reports for blast furnaces and rolling mills operated under the same ownership. As a rule, each plant for which returns were made was such as could properly be reported as one establishment and assigned to one of the 339 classifications of industry according to the product of chief value.²

The "establishment" is a statistical unit, the significance of which changes to meet the requirements of the different methods of bookkeeping and the practice of the Office in the compilation of the data. There is an increasing tendency in many branches of industry to bring independent manufacturing enterprises under one ownership and direct their operations from a central office. This condition increases the cases in which a number of mills or plants are considered as a single establishment by the Census, and in some instances explains the apparent decrease in the number of establishments.

Number not significant.—Since the interpretation of the term "establishment" is not always the same, the number of establishments engaged in the various industries is no indication of the magnitude of those industries, nor is it a true guide to the number of buildings, mills, or plants devoted to the industries. However, concentration of ownership and variations in the manner of reporting different plants under the same ownership as separate establishments, have not entirely destroyed the utility of the unit of measurement. The totals may be accepted as a general indication of the number of manufacturing enterprises. The apparent increase of 8,700, or 4.2 per cent, in the number of establishments, however, should not be accepted as an indication of the number of enterprises established between the censuses; it is rather an indication of the net gain, which is obtained by adding the new establishments and deducting the old ones that have gone out of existence. New enterprises are constantly being established and old ones abandoned. These increases and decreases may exactly offset each other in one industry and may cause a net decrease in another, but in both instances the statistics of capital, employees, wages, and other items may show decided gains, the increases being due to the larger size of the new establishments or the expansion of the old ones.

In considering the figures for the different industries, and for cities for which the number of establishments is comparatively small, and there is little chance for the results of the various methods to balance each other, it must be remembered that a number of apparently independent plants may have been counted as a single establishment.

Omission, concentration, and removal.—The omission of the neighborhood and mechanical industries has largely eliminated the small shops from the Census reports, but there are very few industries in which there are not some small establishments. The development of the large plants necessarily tends to concentrate the production and close out the smaller establishments; therefore the decrease in the number of establishments may be due to the consolidation of formerly independent plants, while the capacity of the plants remains practically the same. Some establishments make such a radical change in the class of products between censuses that the report for a subsequent census is necessarily assigned to a different

¹ Twelfth Census, Manufactures, Part I, page lxiii.

² See page xxvi.

classification of industry from the one in which it was formerly placed. The removal of plants to more desirable localities is also an explanation of the apparent decrease in some states and cities. These increases, decreases, consolidations, and removals are only the underlying details in the constant advance of the manufacturing industries of the country. This advance is accompanied by an increase in the total number of establishments for the United States. The totals for the census of 1905, as compared with those for 1900, show an increase of 21,413¹ establishments in 168 industries, and a decrease of 12,713 establishments in 140 industries. In the industries for which a decrease is shown there were 85,519 establishments in 1900 and 72,806 in 1905, a decrease of 14.9 per cent. The following comparative table shows the decrease in the number of establishments for 13 of the industries reporting large decreases:

TABLE III.—Number of establishments in thirteen industries showing decrease: 1905 and 1900.

INDUSTRY.	1905	1900	Decrease.
Total.....	52,133	60,782	8,649
Bookbinding and blank book making.....	908	954	46
Boots and shoes.....	1,316	1,509	283
Brick and tile.....	4,634	5,423	789
Brooms and brushes.....	1,316	1,523	207
Carriages and wagons.....	4,956	6,204	1,248
Cars and general shop construction and repairs by steam railroad companies.....	1,141	1,293	152
Cheese, butter, and condensed milk.....	8,926	9,242	316
Clothing, men's.....	4,504	5,729	1,225
Cooperage.....	1,517	1,694	177
Leather, tanned, curried, and finished.....	1,049	1,306	257
Lumber and timber products.....	19,127	23,053	3,926
Marble and stone work.....	1,042	1,655	613
Shipbuilding.....	1,097	1,107	10

The striking fact in this table is that the decrease in the number of establishments was largest in the industries for which it was difficult to distinguish between the establishments that should be, and those that should not be, included in the factory census of 1905. For example, a decrease of 3,926 is shown in the number of establishments manufacturing "lumber and timber products." This industry as reported at the census of 1900 included the small custom sawmills which constituted a large proportion of the establishments. In the reexamination of the schedules for 1900 it was found to be impossible to eliminate exactly the same class of establishments as that excluded from the census of 1905, and it is probable that the revised total for 1900 still includes some small establishments of the class not enumerated in 1905. This fact, and the fact that there has been an actual decrease in the number of lumber mills in some of the states, accounts for the decrease in the total for the United States. The next largest decrease is in the number of establishments reported for "carriages and wagons." A

¹The increase of 21,413 establishments includes 176 classified as "dairymen's, poulterers', and apiarists' supplies." In 1900 these establishments were included in various classifications of mechanical industries.

number of the establishments included in this classification at the census of 1900 were wheelwright or blacksmith shops in which 5 or more vehicles were manufactured on order of customers. In revising the tabulation for comparison with the totals for 1905, the same difficulties were encountered as in the revision of the statistics for the lumber industry. It is probable, however, that there has been an actual decrease in the number of small establishments of the character that should be included in a factory census.

Some industries in practically all of the states and territories show a decrease in the number of establishments, but in only 13 states and the District of Columbia are these decreases sufficient to overcome the increases and result in a net decrease for all industries in the state or District. The totals for these states and the District are shown in Table IV.

TABLE IV.—Number of establishments in states showing decrease: 1905 and 1900.

STATE.	1905	1900	Decrease.
Total.....	58,236	59,893	1,657
Alabama.....	1,882	2,000	118
Delaware.....	631	633	2
District of Columbia.....	482	491	9
Indiana.....	7,044	7,128	84
Iowa.....	4,785	4,828	43
Maryland.....	3,852	3,886	34
Massachusetts.....	10,723	10,929	206
Missouri.....	6,404	6,853	449
Montana.....	382	395	13
New Hampshire.....	1,618	1,771	153
North Carolina.....	3,272	3,465	193
Ohio.....	13,785	13,808	23
Rhode Island.....	1,617	1,678	61
Vermont.....	1,099	1,938	839

In each of these states and in the District of Columbia the industries showing the largest decreases are those enumerated in Table III. The greatest decrease—389 establishments—is shown for Missouri and is due largely to the decrease of 397 in the number of establishments reported as manufacturing carriages and wagons, and lumber and timber products.

IDLE ESTABLISHMENTS.

Instructions to the field force at the Twelfth Census provided that, as far as possible, answers should be obtained to such questions relating to capital and to power and equipment, for the establishments that were idle during the entire year. Returns were secured from 3,864 idle establishments, with a capital of \$99,440,311. While the instructions at the census of 1905 were much the same, the changed conditions attending a factory census did not permit of securing returns for all plants that were idle during the entire period of twelve months.

At the census of 1900 the reports for establishments in the rural districts were collected by the enumerators when they were enumerating the population and collecting the statistics of agriculture. These officers visited every section of the country, and it was com-

paratively easy for them to secure the required reports for idle establishments. The fact that the compensation for such partial reports was the same as that for complete reports, was an inducement to secure the information.

Of the 3,864 idle establishments enumerated in 1900, about 1,500 were for industries peculiar to the rural districts and 715 for industries omitted from the factory census of 1905. To secure reports for all idle factories at the latter census it would have been necessary for the agents to visit many localities in which there were no active establishments, and, after locating the idle factory, to search for the owner and secure estimates of values, etc. It was decided that the comparatively small economic value of the statistics of capital for such establishments would not justify the large expense incident to their enumeration. However, reports were received from 2,330 idle establishments. While it is possible that a more thorough canvass was made of the idle establishments at the census of 1900 than at the census of 1905, it is interesting to compare the results of the two censuses, and this is done in Table v. In this table the totals for 1900 have been reduced by the exclusion, as far as possible, of the statistics for establishments of the class omitted from the factory census of 1905.

TABLE V.—*Comparative summary—idle establishments: 1905 and 1900.*

	1905	1900 ¹
Number of establishments.....	2,330	3,149
Capital, total.....	\$132,898,781	\$98,271,094
Land.....	\$21,208,036	\$25,614,430
Buildings.....	\$40,107,741	\$28,962,778
Machinery, tools, and implements.....	\$55,798,474	\$31,604,734
Cash.....	\$15,784,530	\$12,029,152
Number of establishments reporting power.....	1,675	1,990
Horsepower, total.....	344,671	203,774
Steam.....	316,572	109,322
Water.....	17,132	30,495
All other.....	10,967	3,957

¹Exclusive of the hand trades and neighborhood industries, omitted from census of 1905.

It is probable that there were included among the idle establishments some new mills in course of construction and not in operation prior to the close of the census year. Moreover, at the census of 1900 the enumerators in the rural districts may have reported as idle some establishments which, while not in operation at the time they called, were nevertheless active at some time during the twelve months and should have been reported as active. This possibility of an inflation of the figures was reduced to the minimum at the census of 1905, because most of the work was done by regular employees of the Office, who appreciated the necessity of securing a complete report for every establishment in operation, either on full or partial time, however short.

When a large number of idle establishments are reported for an industry, it does not follow that there has been a decrease in the products of that industry. In order to obtain advantages resulting from closer proximity to the source of the raw material used, or to the point of distribution of the finished product, or for other reasons, it is sometimes necessary to change the location of an industry and abandon the plants either temporarily or permanently. In such cases the old plants, if not abandoned, would be enumerated as idle, but the production of the new and possibly larger plants would more than overcome the loss in production that ought apparently to follow an increase in the number of idle plants. A decrease in the capital, employees, wages, or products for an industry may be due to a change in the kind of products made by some of the important establishments. The statistics for industries other than those in which these establishments were formerly employed will therefore show an increase in the number of establishments, and no idle plants will be reported for the industry from which they have withdrawn and which shows a decrease in production. This may be illustrated by the bicycle and tricycle industry, which shows a very large decrease since 1900. The industry was at its height during and just prior to the year covered by the Twelfth Census, but before the enumeration for the census of 1905 many of the factories had discontinued the manufacture of bicycles and engaged in the manufacture of automobiles, and in various branches of machine shop work. It is probable that some establishments reported as idle were abandoned and would not again be used for manufacturing.

In view of the methods followed in making the enumeration, the statistics for idle establishments should not be accepted as complete at either census, nor as indicating a depressed condition in any branch of industry.

It is impracticable to revise the totals of 1900 for each state by eliminating establishments of the character not reported at the census of 1905. The totals reported at the census of 1900, however, show that Pennsylvania, New York, Washington, Illinois, and Massachusetts, in the order named, reported the largest amounts of idle capital, the total—\$41,430,084—for the 5 states forming 41.7 per cent of the total for the United States. At the census of 1905 the 5 leading states were Pennsylvania, New York, Ohio, California, and Indiana, the idle capital in these states amounting to \$69,271,740, or 52.1 per cent of the total.

At the census of 1900 the industries with the largest amounts of capital invested in idle establishments were iron and steel, lumber and timber products, brick and tile, paper and wood pulp, and woolen goods, the total

for these industries amounting to \$48,044,012, or 48.3 per cent of the total for all industries. At the census of 1905 the largest amounts were reported for iron and steel, sugar and molasses refining, cotton goods, beet sugar, and lumber and timber products; the idle capital for the 5 industries amounting to \$69,179,027, or 52.1 per cent of the total for the United States. All of these industries show substantial increases in the production of the active plants since 1900, so the comparatively large amount of idle capital is no indication of a general depression in any of them.

Of the \$22,836,548 capital shown for idle blast furnaces at the census of 1905, \$19,456,374, or 85.2 per cent, was reported for the idle plants in Pennsylvania, Alabama, Virginia, New York, New Jersey, and Ohio. The capital represented by the idle steel works and rolling mills in Pennsylvania, Indiana, Ohio, Wisconsin, and New York amounted to \$18,439,971, or 86.8 per cent of the total for the United States. Pennsylvania ranked first in the amount of idle capital reported for both of these branches of the iron and steel industry.

The idle capital for cotton factories was confined largely to plants in the Southern states, the 5 states Virginia, Georgia, South Carolina, North Carolina, and Mississippi reported \$5,054,415, or 69.4 per cent of the total.

The idle lumber mills were well distributed. The largest amount of capital invested in such mills, \$710,665, was reported for Louisiana and the next largest, \$675,399, for Oregon. The idle capital for these states combined with that reported for Washington, Michigan, Minnesota, Georgia, and Wisconsin amounted to \$3,520,423, or 68.8 per cent of the total.

Louisiana reported the largest number of idle sugar refineries, but most of them were comparatively small. The major portion of the capital was invested in two large plants in New York and Pennsylvania that were idle during the entire year. The two idle beet sugar factories, representing a capital of \$5,276,581, are located in California.

Tables VI and VII present the statistics of capital and power equipment for the idle factories reported for each state and each industry at the census of 1905.

MANUFACTURES.

TABLE VI.—SUMMARY OF IDLE ESTABLISHMENTS,

	STATE OR TERRITORY.	Number of establishments.	CAPITAL.				
			Total.	Land.	Buildings.	Machinery, tools, and implements.	Cash and sundries.
1	United States.....	2,330	\$132,808,781	\$21,208,036	\$40,107,741	\$55,798,474	\$15,784,530
2	Alabama.....	40	3,770,851	727,290	1,069,042	1,582,740	391,779
3	Alaska.....	12	631,877	65,250	120,000	291,846	154,781
4	Arizona.....	1	550	25	175	200	150
5	Arkansas.....	20	105,800	7,240	16,550	78,950	3,060
6	California.....	76	8,507,174	544,581	2,181,227	5,041,774	739,592
7	Colorado.....	23	3,700,393	162,550	1,050,452	1,264,516	1,222,875
8	Connecticut.....	17	832,835	72,576	254,579	456,701	48,979
9	Delaware.....	6	710,800	34,000	181,000	390,700	105,100
10	Florida.....	13	337,445	14,345	105,150	174,950	43,000
11	Georgia.....	68	2,002,518	343,148	338,595	1,155,514	105,291
12	Illinois.....	110	4,124,894	1,076,766	904,399	1,986,756	156,973
13	Indian Territory.....	7	118,487	8,200	29,950	59,620	20,717
14	Indiana.....	126	7,988,920	787,687	2,766,745	4,212,070	222,427
15	Iowa.....	58	780,253	65,023	307,560	382,799	24,865
16	Kansas.....	32	379,343	35,302	144,208	159,889	39,884
17	Kentucky.....	79	3,010,440	263,758	1,065,385	1,399,015	282,282
18	Louisiana.....	72	2,462,625	99,660	549,250	1,603,475	210,240
19	Maine.....	60	589,005	98,277	182,764	236,366	71,598
20	Maryland.....	35	637,912	224,013	218,860	139,438	55,601
21	Massachusetts.....	51	2,912,806	873,959	984,121	943,329	111,397
22	Michigan.....	118	3,041,750	741,475	862,149	1,149,053	289,073
23	Minnesota.....	50	1,928,877	735,065	276,967	599,341	407,504
24	Mississippi.....	32	856,548	124,527	232,954	438,992	60,075
25	Missouri.....	43	891,024	587,610	95,239	160,343	47,832
26	Montana.....	3	1,559,743	9,450	584,000	307,700	658,593
27	Nebraska.....	12	505,850	55,850	211,000	227,500	10,600
28	Nevada.....	2	42,000	14,900	15,500	11,600	
29	New Hampshire.....	16	172,608	20,080	35,817	81,866	34,915
30	New Jersey.....	45	5,004,241	1,067,207	1,753,569	1,667,799	515,606
31	New Mexico.....	8	54,050	4,180	13,830	35,990	50
32	New York.....	111	11,387,844	2,767,737	3,584,474	3,583,596	1,452,037
33	North Carolina.....	59	1,519,333	128,362	608,732	682,773	99,466
34	North Dakota.....	3	23,950	400	11,500	12,050	
35	Ohio.....	106	9,168,240	1,348,065	2,690,556	4,307,130	822,489
36	Oklahoma.....	6	35,800	800	7,250	23,800	3,950
37	Oregon.....	48	1,534,002	238,202	552,580	654,930	88,200
38	Pennsylvania.....	299	32,219,553	5,524,529	9,665,941	12,400,623	4,628,400
39	Rhode Island.....	17	1,523,677	152,550	780,974	277,253	312,900
40	South Carolina.....	19	1,038,457	28,362	218,129	641,898	150,068
41	South Dakota.....	7	515,975	152,500	275,700	64,300	23,475
42	Tennessee.....	39	1,001,209	236,775	425,865	312,880	25,689
43	Texas.....	40	2,311,999	345,050	669,628	939,054	358,267
44	Utah.....	13	288,675	68,175	40,200	160,850	10,450
45	Vermont.....	12	109,700	7,550	22,850	64,150	15,150
46	Virginia.....	51	4,704,192	464,427	1,896,080	1,603,949	739,730
47	Washington.....	56	1,723,935	280,175	395,800	859,140	188,820
48	West Virginia.....	57	2,332,877	84,268	671,738	1,056,345	520,526
49	Wisconsin.....	90	3,586,687	515,265	1,010,515	1,816,953	243,954
50	Wyoming.....	2	210,988	700	18,250	185,978	6,000

ESTABLISHMENTS AND CHARACTER OF OWNERSHIP.

xlvi

BY STATES AND TERRITORIES: 1905.

POWER OWNED.													
Num- ber of estab- lish- ments report- ing.	Total horse- power.	Engines.				Water wheels.		Water motors.		Electric motors.		Other power.	
		Steam.		Gas or gasoline.									
		Number.	Horse- power.	Number.	Horse- power.	Number.	Horse- power.	Number.	Horse- power.	Number.	Horse- power.	Number.	Horse- power.
1,675	344,671	2,550	310,572	84	1,941	309	17,093	5	39	419	8,776	10	250
31	13,410	61	13,345			1	65						
12	1,368	14	921	1	8	4	425	1	8	1	6		
12	654	13	654										
40	6,947	63	5,474	3	30	8	220	2	1	64	1,222		
18	2,372	19	1,610	3	145	6	112			8	505		
12	2,420	17	2,121			7	199			3	100		
3	1,855	14	1,855										
9	1,010	12	850	1	160								
44	4,629	55	3,764			6	775			2	90		
78	12,260	113	9,931	5	54	12	909			47	1,366		
6	250	8	250										
86	26,233	185	24,364	13	762	10	425			59	632		
42	2,684	38	2,603	6	35	9	266			1	80		
23	848	19	745	1	8	4	95						
66	10,717	111	10,507			3	205	1	5				
57	9,630	104	9,620	1	10								
42	2,299	30	1,350			20	949						
13	785	11	728	3	37	2	20						
30	6,399	37	5,586	1	5	10	408			9	400		
77	5,690	81	5,428	5	43	4	154			1	65		
31	3,969	43	3,490	1	8	8	228			15	243		
31	2,650	38	2,610	1	10					1	30		
32	1,981	31	1,691			5	200						
2	1,680	8	1,650							1	30		
9	741	9	741										
2	130	2	130										
11	1,735	7	240			15	1,470			1	25		
32	7,808	51	6,098	1	4	5	160			57	946		
7	305	6	265			2	40						
80	30,985	166	28,935	3	90	35	1,660	1	25	11	275		
32	2,025	33	2,222	1	25	11	678						
3	128	3	128										
135	34,059	246	33,149	8	111	9	251			55	448	2	100
3	155	3	155										
38	4,634	53	4,279			10	355						
212	90,033	467	86,866	13	212	41	1,446			56	1,359	8	150
12	2,779	10	1,835	1	22	6	300			7	622		
12	1,045	15	1,045										
5	415	6	415										
29	4,121	38	4,116							1	5		
28	4,296	35	4,228	1	4					4	64		
7	432	3	330	1	20	3	82						
10	371	5	176	3	15	4	180						
42	16,440	65	12,946			25	3,494						
49	5,626	70	5,170			7	443			1	13		
50	4,688	49	4,542	3	60	5	76			1	10		
68	6,750	72	5,784	4	63	12	713			13	190		
2	1,030	11	1,030										

MANUFACTURES.

TABLE VII.—SUMMARY OF IDLE

INDUSTRY.	Number of establishments.	CAPITAL.				
		Total.	Land.	Buildings.	Machinery, tools, and implements.	Cash and sundries.
1 All industries.....	2,330	\$132,898,781	\$21,208,036	\$40,107,741	\$55,798,474	\$15,784,530
2 Agricultural implements.....	8	242,400	42,125	75,075	32,500	92,700
3 Ammunition.....	2	43,700	8,000	12,500	23,000	200
4 Artificial feathers and flowers.....	1	15			15	
5 Artificial stone.....	5	47,550	18,500	6,000	19,800	3,250
6 Automobiles.....	3	526,552	40,000	119,000	175,750	191,793
7 Bags, other than paper.....	1	33,000	5,000	8,000	20,000	
8 Baking and yeast powders.....	1	60,000	30,000	30,000		
9 Baskets, and rattan and willow ware.....	3	1,755	350	750	615	50
10 Beet sugar.....	2	5,276,581	160,466	1,516,202	3,287,404	303,419
11 Belting and hose, linen.....	1	8,300	300	3,000	5,000	
12 Bicycles and tricycles.....	3	122,500	67,400	46,600	8,500	
13 Bone, ivory, and lamp black.....	2	38,750	2,100	10,650	25,000	1,000
14 Bookbinding and blank book making.....	1	600			600	
15 Boots and shoes.....	6	57,050	1,650	18,600	9,800	27,000
16 Boots and shoes, rubber.....	1	43,000	1,500	9,600	26,000	5,000
17 Boxes, wooden packing.....	5	25,650	2,900	6,300	11,950	4,500
18 Brass castings and brass finishing.....	3	311,727	66,682	72,263	74,113	98,669
19 Bread and other bakery products.....	4	91,342	11,200	40,240	15,952	23,941
20 Brick and tile.....	162	1,603,066	509,363	418,918	614,928	149,857
21 Brooms and brushes.....	2	4,550	25	175	4,200	150
22 Butter.....	81	209,570	15,548	87,040	103,813	3,169
23 Buttons.....	6	242,850	8,200	62,400	163,200	9,050
24 Canning and preserving, fish.....	32	1,260,652	227,900	352,575	642,831	67,346
25 Canning and preserving, fruits and vegetables.....	99	892,158	103,190	322,010	306,315	160,643
26 Canning and preserving, oysters.....	1	2,939	600	1,235	815	289
27 Carpets and rugs, other than rag.....	1	14,000	1,540	4,340	8,120	
28 Carpets, rag.....	1	4,630	4,000	300	30	300
29 Carriage and wagon materials.....	6	110,898	24,450	43,895	40,553	2,000
30 Carriages and sleds, children's.....	1	1,065			765	300
31 Carriages and wagons.....	8	84,934	10,800	27,038	31,927	15,169
32 Cars and general shop construction and repairs by steam railroad companies.....	2	5,500	1,800	3,500	200	
33 Cars, steam railroad, not including operations of railroad companies.....	2	511,500	80,000	300,000	130,000	1,500
34 Cars, street railroad, not including operations of railroad companies.....	1	59,315	330	10,571	11,258	37,156
35 Cash registers and calculating machines.....	2	92,000	2,000	10,000	62,000	18,000
36 Cement.....	18	2,641,939	617,284	840,235	1,069,820	114,000
37 Cheese.....	25	38,875	4,650	19,400	14,425	400
38 Chemicals.....	9	678,925	250,480	173,000	237,770	17,675
39 Clocks.....	1	20,000	1,500	4,500	12,000	2,000
40 Clothing, men's.....	5	24,800	150	3,450	7,000	13,100
41 Clothing, women's.....	4	18,025	3,500	10,000	4,150	375
42 Coffins, burial cases, and undertakers' goods.....	2	9,600	800	3,500	5,000	300
43 Coke.....	29	2,703,149	577,965	136,818	1,207,132	691,234
44 Condensed milk.....	1	50,004	3,000	17,000	20,000	10,004
45 Confectionery.....	1	65,000	6,000	24,000	25,000	10,000
46 Cooperage.....	10	87,840	10,850	43,500	18,475	15,015
47 Coppersmithing and sheet iron working.....	3	44,400	19,300	10,000	13,000	1,500
48 Cordage and twine.....	2	1,050,000	284,500	415,000	350,500	
49 Cork, cutting.....	1	26,000	1,000	7,000	8,000	10,000
50 Corsets.....	1	1,100			800	300
51 Cotton goods.....	43	7,286,638	912,332	2,150,077	3,572,986	651,243
52 Cotton small wares.....	2	18,500	3,200	6,300	9,000	
53 Cutlery and edge tools.....	7	355,200	50,550	117,438	158,284	28,988
54 Dairymen's, poultryers', and apiarists' supplies.....	1	1,500			500	1,000
55 Druggists' preparations.....	1	2,156			1,154	1,002
56 Dyeing and finishing textiles.....	4	61,850	9,550	21,000	21,300	10,000
57 Dye-stuffs and extracts.....	2	15,500	500	2,000	3,300	9,700
58 Electrical machinery, apparatus, and supplies.....	7	399,256	29,186	98,500	209,394	62,176
59 Explosives.....	4	1,117,383	245,250	355,264	480,295	36,574
60 Fancy articles, not elsewhere specified.....	2	3,785		800	1,025	1,000
61 Felt goods.....	1	1,700	200	1,000	500	
62 Fertilizers.....	3	186,050	10,550	27,250	80,750	67,500
63 Files.....	5	313,500	47,000	150,000	106,000	1,500
64 Flavoring extracts.....	1	3,175			175	3,000
65 Flax and hemp, dressed.....	3	25,000	2,300	5,500	11,200	5,000
66 Flour and grist mill products.....	248	3,982,434	739,519	1,194,961	1,623,987	423,967
67 Food preparations.....	12	124,888	30,700	36,300	45,870	12,018
68 Foundry and machine shop products.....	96	2,575,901	487,885	858,596	795,555	433,885
69 Foundry supplies.....	1	20,000	3,000	7,000	7,000	
70 Fuel, manufactured.....	3	119,767	13,192	51,974	69,601	5,000
71 Furniture.....	20	465,711	38,696	170,494	142,424	114,097
72 Gas, illuminating and heating.....	9	487,650	14,350	43,400	151,907	277,993
73 Gas machines and meters.....	1	2,363			105	2,258
74 Glass cutting, staining, and ornamenting.....	40	4,992,211	438,490	2,984,150	1,513,854	55,737
75 Gloves and mittens, leather.....	1	14,500		10,000	4,500	
76	3	90,500	2,040	13,100	15,360	60,000

xlix

ESTABLISHMENTS, BY INDUSTRIES: 1905.

[illegible]

MANUFACTURES.

TABLE VII.—SUMMARY OF IDLE

INDUSTRY.	Number of establishments.	CAPITAL.				
		Total.	Land.	Buildings.	Machinery, tools, and implements.	Cash and sundries.
77 Glucose.....	3	\$1,536,000	\$150,000	\$416,500	\$969,500	.....
78 Glue.....	1	18,000	6,000	6,000	6,000	.....
79 Graphite and graphite refining.....	4	991,500	885,000	37,000	25,000	\$44,500
80 Grindstones.....	1	25,000	18,000	2,000	5,000	.....
81 Gypsum wall plaster.....	2	37,400	10,000	10,600	10,300	500
82 Hat and cap materials.....	1	65,000	14,300	18,200	32,500	.....
83 Hones and whetstones.....	1	500	.....	.....	400	100
84 Horseshoes.....	1	103,600	3,000	20,000	110,000	30,000
85 Hosiery and knit goods.....	16	453,060	66,180	103,320	240,485	43,075
86 House furnishing goods not elsewhere specified.....	3	31,566	300	9,000	6,266	16,000
87 Ice, manufactured.....	33	808,055	143,611	235,402	423,567	5,475
88 Iron and steel, blast furnaces.....	74	122,836,548	3,494,133	10,743,070	5,887,941	2,711,404
89 Iron and steel, steel works and rolling mills.....	79	121,247,646	2,748,342	3,939,504	13,237,973	1,321,767
90 Iron and steel, bolts, nuts, washers, and rivets, not made in rolling mills or steel works.....	1	91,120	42,250	22,750	10,000	16,120
91 Iron and steel forgings.....	1	140,000	40,000	20,000	80,000	.....
92 Iron and steel, nails and spikes, cut and wrought, including wire nails, not made in rolling mills or steel works.....	4	109,000	23,000	35,000	46,000	5,000
93 Iron and steel pipe, wrought.....	4	874,440	91,181	297,524	473,398	12,337
94 Ivory and bone work.....	1	4,500	500	1,500	500	2,000
95 Jewelry.....	2	3,000	.....	.....	3,000	.....
96 Kaolin and ground earths.....	5	105,276	20,000	31,057	32,415	15,804
97 Lamps and reflectors.....	1	63,000	20,000	40,000	3,000	.....
98 Leather, tanned, curried, and finished.....	19	322,465	81,340	150,235	70,175	20,715
99 Lime.....	8	75,683	54,295	5,450	15,918	.....
100 Linen goods.....	1	58,000	5,000	35,000	13,500	4,500
101 Liquors, distilled.....	91	4,256,210	1,402,545	746,670	1,633,640	473,355
102 Liquors, malt.....	13	724,566	77,325	346,291	223,290	77,660
103 Liquors, vinous.....	7	105,095	13,025	19,030	18,000	55,040
104 Looking-glass and picture frames.....	1	1,817,695	103,865	727,090	986,740	.....
105 Lumber and timber products.....	378	5,115,221	753,911	804,825	2,507,027	1,049,458
106 Lumber, planing mill products, including sash, doors, and blinds.....	50	393,530	58,370	92,405	147,825	94,930
107 Malt.....	2	100,500	6,000	72,000	2,300	20,200
108 Marble and stone work.....	3	95,000	28,900	12,200	44,400	9,500
109 Matches.....	1	7,804	300	5,004	2,600	.....
110 Mattresses and spring beds.....	1	304	.....	.....	157	147
111 Mineral and soda waters.....	8	30,105	5,650	12,200	7,150	5,105
112 Mirrors.....	1	5,000	.....	.....	1,000	4,000
113 Models and patterns, not including paper patterns.....	1	5,800	800	1,000	4,000	.....
114 Monuments and tombstones.....	4	16,225	650	1,800	6,425	7,350
115 Musical instruments, organs.....	1	630	300	300	30	.....
116 Needles, pins, and hooks and eyes.....	2	12,700	.....	.....	8,000	4,700
117 Oil, cottonseed and cake.....	8	690,541	87,540	161,705	398,120	43,176
118 Oil, essential.....	1	1,500	100	300	1,100	.....
119 Oil, not elsewhere specified.....	4	47,200	1,500	5,500	31,100	9,100
120 Oilcloth and linoleum, floor.....	1	61,000	15,000	25,000	6,000	15,000
121 Paints.....	10	929,377	104,234	225,500	321,252	278,391
122 Paper and wood pulp.....	23	2,734,971	334,398	952,272	1,419,267	29,034
123 Paper goods, not elsewhere specified.....	2	47,500	2,500	12,000	33,000	.....
124 Patent medicines and compounds.....	7	37,000	875	1,900	5,380	28,905
125 Perfumery and cosmetics.....	1	1,000	.....	.....	200	800
126 Petroleum, refining.....	6	618,015	93,163	79,493	429,042	16,317
127 Photographic apparatus.....	1	18,500	3,000	3,000	10,000	2,500
128 Photographic materials.....	1	3,150	.....	.....	3,000	150
129 Pickles, preserves, and sauces.....	3	13,956	2,652	6,621	3,833	850
130 Plated ware.....	1	250	.....	100	150	.....
131 Pottery, terra cotta, and fire clay products.....	43	3,522,656	1,000,216	1,285,236	539,860	697,344
132 Printing and publishing, book and job.....	11	16,415	.....	.....	12,415	4,000
133 Printing and publishing, newspapers and periodicals.....	5	12,100	1,750	1,450	8,400	500
134 Pulp goods.....	2	116,500	27,000	40,000	48,700	800
135 Refrigerators.....	1	1,000	.....	.....	200	800
136 Roofing materials.....	5	103,075	41,276	8,600	14,196	39,003
137 Rubber and elastic goods.....	3	27,000	6,250	10,250	10,500	.....
138 Saddlery and harness.....	1	1,325	700	150	225	250
139 Salt.....	7	348,389	127,550	90,309	118,530	12,000
140 Sand and emery paper and cloth.....	1	40,000	4,800	20,000	15,200	.....
141 Sausage.....	2	11,500	2,600	3,400	2,500	3,000
142 Saws.....	1	1,600	.....	.....	1,000	600
143 Scales and balances.....	1	2,003	75	25	634	1,269
144 Screws, machine.....	1	200,000	34,000	64,000	102,000	.....
145 Shipbuilding, iron and steel.....	1	30,000	10,000	10,000	10,000	.....
146 Shipbuilding, wooden, including boat building.....	9	85,025	29,800	28,800	20,700	6,325
147 Shirts.....	3	6,650	1,050	600	5,000	.....
148 Shoddy.....	3	124,500	23,150	57,890	41,800	1,750
149 Silk and silk goods.....	19	346,100	33,620	114,850	155,830	41,800
150 Silversmithing and silverware.....	1	18,355	600	14,000	1,755	2,000
151 Slaughtering and meat packing, wholesale.....	2	342,500	125,000	176,500	35,000	6,000

¹Includes value of leased property.

ESTABLISHMENTS AND CHARACTER OF OWNERSHIP.

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ESTABLISHMENTS, BY INDUSTRIES: 1905—Continued.

POWER OWNED.													
Number of establishments reporting.	Total horse-power.	Engines.				Water wheels.		Water motors.		Electric motors.		Other power.	
		Steam.		Gas or gasoline.		Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.
		Number.	Horse-power.	Number.	Horse-power.								
3	6,084	27	4,675							46	1,409		
2	200	3	200										
1	100	1	100										
1	10	1	10										
1	100	1	100										
1	384	3	375							1	9		
8	904	8	569	1	25	2	310						
1	25	1	25										
20	1,467	25	1,462							1	5		
72	89,625	250	89,465			2	82			2	78		
73	95,241	467	91,130	2	325	8	440			157	3,196	8	150
1	100	1	100										
3	1,201	9	1,193			1	8						
2	1,964	9	1,964										
5	481	6	481										
14	848	17	813	2	15	1	20						
2	22	2	22			1	65						
1	65												
65	4,045	111	4,045										
10	567	15	562							1	5		
2	33	1	7	1	1			1	25				
1	687	3	575			5	92						
371	28,177	435	26,002	3	185	47	1,972	1	5	1	13		
45	2,252	47	1,987	2	50	5	215						
2	50	2	50										
2	110	3	110										
3	21	2	11	1	10								
1	12	1	12										
1	6	1	6										
8	1,240	12	1,240										
1	15	1	15										
2	50	2	50										
1	150	2	150										
6	833	3	340	1	50	7	403			1	40		
20	9,200	44	6,827	4	300	24	2,040			2	33		
2	455	3	155			4	300						
2	33	2	33										
4	125	7	110							1	15		
1	45	1	45										
1	5	1	5										
1	4			1	4								
35	3,744	38	3,714							1	30		
1	2			1	2								
1	505	2	500										
5	637	9	637										
5	428	6	355	4	73								
1	5			1	5								
1	20	1	20										
1	7			1	7								
1	35	1	35										
5	454	7	454										
2	12			2	12								
5	185	2	125			1	60						
5	458	3	150	1	4	3	304						
1	25	1	25										
2	290	2	290										

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MANUFACTURES.

TABLE VII.—SUMMARY OF IDLE

	INDUSTRY.	Number of estab- lish- ments.	CAPITAL.				
			Total.	Land.	Buildings.	Machinery, tools, and im- plements.	Cash and sundries.
			\$3,461,991	\$103,085	\$713,462	\$663,976	\$1,981,408
152	Smelting and refining, copper.....	6	326,400	6,800	152,000	167,000	
153	Smelting and refining, lead.....	3	386,000	131,000	216,000	35,300	2,500
154	Smelting and refining, zinc.....	6	47,525	2,800	12,800	23,575	8,350
155	Soap.....	1	5,500			500	5,000
156	Soda water apparatus.....	1					
157	Springs, steel, car and carriage.....	2	71,027	21,000	11,400	37,700	327
158	Starch.....	11	589,400	50,100	228,900	186,300	124,100
159	Stationery goods, not elsewhere specified.....	1	4,125	200	2,000	1,800	125
160	Steam fittings and heating apparatus.....	2	109,500	20,000	31,500	55,000	3,000
161	Steam packing.....	1	52,000	20,000	5,000	17,000	10,000
162	Stoves and furnaces, not including gas and oil stoves.....	2	109,710	7,000	35,905	31,002	35,803
163	Stoves, gas and oil.....	1	10,000		6,000	4,000	
164	Straw goods, not elsewhere specified.....	1	15,000	3,600	4,500	6,900	
165	Structural ironwork.....	8	754,127	64,630	135,169	372,608	181,720
166	Sugar and molasses, refining.....	13	7,416,393	1,430,521	1,119,006	3,489,558	1,177,308
167	Sulphuric, nitric, and mixed acids.....	1	50,000	3,000	8,000	39,000	
168	Surgical appliances.....	1	175,000	28,575	55,300	90,825	
169	Tin andterne plate.....	5	447,810	17,100	122,510	201,914	16,286
170	Tinware.....	1	32,900	3,000	3,500	25,000	1,400
171	Tobacco, chewing, smoking, and snuff.....	8	60,085	3,635	8,800	8,350	39,300
172	Tobacco, cigars and cigarettes.....	12	19,885	850	3,200	10,865	4,970
173	Tools, not elsewhere specified.....	4	76,896	2,500	7,700	65,096	1,000
174	Toys and games.....	2	4,500	1,150	650	1,250	1,450
175	Trunks and valises.....	1	6,100	1,000	2,500	2,000	600
176	Turpentine and rosin.....	25	132,136	9,173	18,110	57,497	47,356
177	Upholstering materials.....	5	24,400	750	2,350	10,750	10,550
178	Vault lights and ventilators.....	1	3,000	400	2,100	500	
179	Vinegar and cider.....	9	78,985	12,300	21,300	21,650	23,735
180	Windmills.....	2	86,400	12,573	23,335	44,107	6,385
181	Window shades and fixtures.....	1	9,500	2,000	5,000	2,500	
182	Wire.....	1	17,700	3,200	3,000	8,000	3,500
183	Wirework, including wire rope and cable.....	5	262,202	11,682	113,176	98,157	39,187
184	Wood distillation, not including turpentine and rosin.....	1	20,000	300	1,700	18,000	
185	Wood preserving.....	2	65,413	20,000	1,000	34,876	9,537
186	Wood, turned and carved.....	21	166,486	14,431	51,375	89,351	11,329
187	Woodenware, not elsewhere specified.....	9	167,722	10,930	38,896	91,460	26,436
188	Wool pulling.....	1	16,000	6,000	4,000	6,000	
189	Woolen goods.....	41	886,825	116,291	261,752	448,532	60,250
190	Worsted goods.....	4	1,145,357	59,500	630,004	163,353	292,500

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POWER OWNED.													
Number of establishments reporting.	Total horse-power.	Engines.				Water wheels.		Water motors.		Electric motors.		Other power.	
		Steam.		Gas or gasoline.									
		Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.
5	4,052	15	3,000	3	128	4	425	1	8	17	431		
3	965	5	665							3	300		
3	1,095	5	1,070			1	25						
4	58	4	58										
1	138	3	90							7	48		
9	2,075	22	2,000							1	75		
1	200	2	200										
2	110	1	60	2	50								
4	870	10	676							22	109	2	100
12	8,288	74	7,276							52	1,012		
3	2,500	4	2,500										
1	15	1	15										
3	255	2	255										
1	7	2	7										
5	84	5	84										
3	90	3	90										
6	114	5	110			1	4						
1	35	1	35										
1	50	1	50										
5	354	4	350	1	4								
1	25	1	25										
2	275	8	275										
13	720	12	710			1	10						
6	345	6	275	1	15	2	55						
1	110	3	110										
32	2,025	27	1,846			22	754			1	25		
4	2,050	5	1,400			1	50			4	600		

CHARACTER OF OWNERSHIP.

Changes in the form of ownership and the relative importance of the establishments operated under each form constitute a significant feature of the development of manufactures. The replies to the Census inquiry enable the statistics for all establishments to be presented under the following classes of ownership: (1) Individual, (2) firm, (3) incorporated company, and (4) "miscellaneous," which embraces cooperative associations. It was impracticable to retabulate the statistics relating to the character of ownership of the 207,562 establishments for the census of 1900, so as to make them comparable with the corresponding data for the census of 1905. But the relative importance of the different classes at the two censuses may be indi-

cated by a comparison of the totals for 1905 with those for 1900 after the data for "hand trades" and 9 additional industries not enumerated at the census of 1905 have been deducted, and also by a comparison of the totals for representative industries. There were 215,814 establishments included in the general group of "hand trades" and 22,735 in the 9 additional industries at the Twelfth Census, and if all of these are eliminated, the total will be reduced to 273,705. While this number includes 66,143 establishments that were excluded from the factory census, it is the only total that is available for a general comparison of the number of establishments and value of products for each class of ownership. This comparison is made in Table VIII.

TABLE VIII.—COMPARATIVE SUMMARY, CHARACTER OF OWNERSHIP: 1905 AND 1900.

	ESTABLISHMENTS.				PRODUCTS.			
	1905		1900 ¹		1905		1900	
	Number.	Per cent.	Number.	Per cent.	Value.	Per cent.	Value.	Per cent.
United States.....	216,262	100.0	273,705	100.0	\$14,802,147,087	100.0	\$11,701,295,854	100.0
Individual.....	113,961	52.7	171,843	62.8	1,702,980,808	11.5	1,837,599,353	15.7
Firm.....	47,042	22.2	62,627	22.9	2,132,619,830	14.4	2,226,833,804	19.0
Incorporated company.....	51,156	23.6	37,161	13.6	10,912,080,421	73.7	7,506,019,056	65.0
Miscellaneous.....	3,203	1.5	2,074	0.7	54,466,028	0.4	30,843,641	0.3

¹ Includes 66,143 establishments that are not of the character covered by the census of 1905; 215,814 establishments representing the group of "hand trades" and 22,735 establishments, representing the industries of bottling, cheese and butter, urban dairy products, cotton compressing, cotton, cleaning and rehandling, cotton ginning, electrical construction and repairs, kindling wood, photography, and tobacco stemming and rehandling, are excluded.

As the totals in this table for the census of 1900 include the custom grist and saw mills and some other establishments of the class omitted from the census of 1905, the figures for the two censuses are not exactly comparable. They can be accepted as indicating a tendency toward the corporate form of ownership in industrial enterprises, but not as showing the true relative conditions at the two censuses.

The table indicates that the percentage of the total number of establishments operated by individuals and the relative magnitude of their operations had decreased to a considerable extent at the census of 1905 as compared with that of 1900. The proportion of the total number of establishments operated by "firms" remained practically stationary, but the percentage that the value of their products formed of the total value decreased. The proportion of both the number

of establishments and the value of products of incorporated companies increased.

The reports on the manufactures of each state and territory given in Part II of the Report on Manufactures, census of 1905, contain comparisons of the number of establishments by character of ownership for selected representative industries. Since these industries are characteristic of the manufactures of each state or territory, the totals derived from them are a good indication of the relative number of establishments of each class in different sections of the country, and they are reproduced in Table IX. The statistics for the two censuses in this table are more directly comparable than those in Table VIII and may be accepted as reflecting actual conditions in so far as such conditions are determined by the principal industries in the different states.

ESTABLISHMENTS AND CHARACTER OF OWNERSHIP.

lv

TABLE IX.—NUMBER OF ESTABLISHMENTS, BY CHARACTER OF OWNERSHIP DERIVED FROM SELECTED INDUSTRIES IN STATES AND TERRITORIES, WITH PER CENT IN EACH CLASS: 1905 AND 1900.

STATE OR TERRITORY, AND CHARACTER OF OWNERSHIP.	1905		1900		STATE OR TERRITORY, AND CHARACTER OF OWNERSHIP.	1905		1900	
	Number of establishments.	Per cent.	Number of establishments.	Per cent.		Number of establishments.	Per cent.	Number of establishments.	Per cent.
United States.....	140,364	100.0	135,695	100.0	Indian Territory.....	227	100.0	124	100.0
Individual.....	76,383	54.4	79,870	58.9	Individual.....	142	62.5	71	57.3
Firm.....	31,705	22.6	33,240	24.5	Firm.....	66	29.1	37	29.8
Incorporated company.....	29,502	21.0	20,780	15.3	Incorporated company.....	25	11.0	16	12.9
Miscellaneous.....	2,774	2.0	1,805	1.3	Miscellaneous.....	4	1.8		
Alabama.....	1,197	100.0	1,313	100.0	Indiana.....	4,474	100.0	4,906	100.0
Individual.....	547	45.7	682	51.9	Individual.....	2,280	50.0	2,709	55.2
Firm.....	361	30.2	453	34.5	Firm.....	1,120	25.0	1,423	29.0
Incorporated company.....	285	23.8	176	13.4	Incorporated company.....	1,046	23.4	754	15.4
Miscellaneous.....	4	0.3	2	0.2	Miscellaneous.....	28	0.6	20	0.4
Alaska.....	63	100.0	36	100.0	Iowa.....	2,394	100.0	2,658	100.0
Individual.....	7	11.1	4	11.1	Individual.....	1,085	45.3	1,306	49.1
Firm.....	3	4.8	1	2.8	Firm.....	559	23.4	653	24.6
Incorporated company.....	53	84.1	31	86.1	Incorporated company.....	420	17.5	436	16.4
Miscellaneous.....					Miscellaneous.....	330	13.8	263	9.9
Arizona.....	28	100.0	39	100.0	Kansas.....	1,348	100.0	1,302	100.0
Individual.....	2	7.1	12	30.8	Individual.....	763	56.6	788	60.5
Firm.....	1	3.6	6	15.4	Firm.....	346	25.7	314	24.1
Incorporated company.....	25	89.3	21	53.8	Incorporated company.....	216	16.0	185	14.2
Miscellaneous.....					Miscellaneous.....	23	1.7	15	1.2
Arkansas.....	1,331	100.0	1,294	100.0	Kentucky.....	2,535	100.0	2,681	100.0
Individual.....	580	43.6	659	50.9	Individual.....	1,334	52.6	1,529	59.2
Firm.....	398	29.9	414	32.0	Firm.....	734	29.0	709	27.5
Incorporated company.....	347	26.1	219	16.9	Incorporated company.....	462	18.2	338	13.1
Miscellaneous.....	6	0.4	2	0.2	Miscellaneous.....	5	0.2	5	0.2
California.....	3,629	100.0	2,586	100.0	Louisiana.....	1,345	100.0	1,208	100.0
Individual.....	1,873	51.6	1,455	56.3	Individual.....	647	48.1	677	56.0
Firm.....	720	19.8	575	22.2	Firm.....	253	18.8	291	24.1
Incorporated company.....	968	26.7	534	20.6	Incorporated company.....	440	32.7	239	19.8
Miscellaneous.....	68	1.9	22	0.9	Miscellaneous.....	5	0.4	1	0.1
Colorado.....	840	100.0	666	100.0	Maine.....	1,803	100.0	1,654	100.0
Individual.....	514	61.2	377	56.6	Individual.....	961	53.3	919	55.5
Firm.....	132	15.7	120	18.0	Firm.....	450	25.5	453	27.4
Incorporated company.....	189	22.5	169	25.4	Incorporated company.....	372	20.6	279	16.9
Miscellaneous.....	6	0.6			Miscellaneous.....	11	0.6	3	0.2
Connecticut.....	1,829	100.0	1,756	100.0	Maryland.....	2,070	100.0	2,023	100.0
Individual.....	877	48.0	905	51.5	Individual.....	1,369	66.1	1,409	69.6
Firm.....	244	13.3	263	15.0	Firm.....	489	23.6	469	23.2
Incorporated company.....	695	38.0	586	33.4	Incorporated company.....	208	10.1	144	7.1
Miscellaneous.....	13	0.7	2	0.1	Miscellaneous.....	4	0.2	1	0.1
Delaware.....	162	100.0	150	100.0	Massachusetts.....	5,957	100.0	6,009	100.0
Individual.....	77	47.5	72	48.0	Individual.....	3,155	53.0	3,302	54.9
Firm.....	47	29.0	49	32.7	Firm.....	1,290	21.7	1,465	24.4
Incorporated company.....	38	23.5	29	19.3	Incorporated company.....	1,480	24.8	1,220	20.3
Miscellaneous.....					Miscellaneous.....	32	0.5	22	0.4
District of Columbia.....	138	100.0	139	100.0	Michigan.....	5,001	100.0	5,108	100.0
Individual.....	69	50.0	72	51.8	Individual.....	2,640	52.8	2,915	57.1
Firm.....	16	11.6	34	24.5	Firm.....	1,179	23.6	1,287	25.2
Incorporated company.....	39	28.3	30	21.6	Incorporated company.....	1,111	22.6	829	16.2
Miscellaneous.....	14	10.1	3	2.1	Miscellaneous.....	71	1.4	77	1.5
Florida.....	1,093	100.0	978	100.0	Minnesota.....	2,905	100.0	2,454	100.0
Individual.....	398	39.7	472	48.3	Individual.....	1,340	46.1	1,164	47.4
Firm.....	401	40.0	415	42.4	Firm.....	553	19.0	651	22.5
Incorporated company.....	293	20.2	91	9.3	Incorporated company.....	409	16.2	396	16.1
Miscellaneous.....	1	0.1			Miscellaneous.....	543	18.7	343	14.0
Georgia.....	1,844	100.0	1,859	100.0	Mississippi.....	922	100.0	824	100.0
Individual.....	793	43.0	873	47.0	Individual.....	356	38.6	437	53.0
Firm.....	586	31.8	729	39.2	Firm.....	285	30.9	256	31.1
Incorporated company.....	465	25.2	256	13.8	Incorporated company.....	279	30.3	130	15.8
Miscellaneous.....			1	(¹)	Miscellaneous.....	2	0.2	1	0.1
Idaho.....	214	100.0	188	100.0	Missouri.....	4,145	100.0	4,537	100.0
Individual.....	99	46.3	119	63.3	Individual.....	2,422	58.4	2,856	62.9
Firm.....	55	25.7	43	22.9	Firm.....	836	20.2	989	21.8
Incorporated company.....	60	28.0	26	13.8	Incorporated company.....	862	20.8	685	15.1
Miscellaneous.....					Miscellaneous.....	25	0.6	7	0.2
Illinois.....	10,782	100.0	10,349	100.0	Montana.....	178	100.0	216	100.0
Individual.....	6,191	57.4	6,329	61.2	Individual.....	75	42.1	108	50.0
Firm.....	1,868	17.3	2,023	19.5	Firm.....	32	18.0	52	24.1
Incorporated company.....	2,562	23.8	1,912	18.5	Incorporated company.....	68	38.2	56	25.9
Miscellaneous.....	161	1.5	85	0.8	Miscellaneous.....	3	1.7		

¹ Less than one-tenth of 1 per cent.

MANUFACTURES.

TABLE IX.—NUMBER OF ESTABLISHMENTS, BY CHARACTER OF OWNERSHIP DERIVED FROM SELECTED INDUSTRIES IN STATES AND TERRITORIES, WITH PER CENT IN EACH CLASS: 1905 AND 1900—Continued.

STATE OR TERRITORY, AND CHARACTER OF OWNERSHIP.	1905		1900		STATE OR TERRITORY, AND CHARACTER OF OWNERSHIP.	1905		1900	
	Number of establishments.	Per cent.	Number of establishments.	Per cent.		Number of establishments.	Per cent.	Number of establishments.	Per cent.
Nebraska.....	1,054	100.0	1,047	100.0	Rhode Island.....	918	100.0	889	100.0
Individual.....	635	60.3	643	61.4	Individual.....	383	41.7	412	46.4
Firm.....	232	22.0	219	20.9	Firm.....	185	20.2	219	24.6
Incorporated company.....	170	16.1	161	15.4	Incorporated company.....	347	37.8	258	29.0
Miscellaneous.....	17	1.6	24	2.3	Miscellaneous.....	3	0.3		
Nevada.....	44	100.0	44	100.0	South Carolina.....	760	100.0	677	100.0
Individual.....	20	45.5	15	34.1	Individual.....	307	40.4	367	54.2
Firm.....	9	20.4	16	36.4	Firm.....	147	19.3	143	21.1
Incorporated company.....	14	31.8	13	29.5	Incorporated company.....	306	40.3	167	24.7
Miscellaneous.....	1	2.3			Miscellaneous.....				
New Hampshire.....	740	100.0	788	100.0	South Dakota.....	472	100.0	430	100.0
Individual.....	380	51.4	426	54.1	Individual.....	257	54.5	215	50.0
Firm.....	204	27.6	217	27.5	Firm.....	85	18.0	79	18.4
Incorporated company.....	155	20.9	143	18.1	Incorporated company.....	59	12.5	77	17.9
Miscellaneous.....	1	0.1	2	0.3	Miscellaneous.....	71	15.0	59	13.7
New Jersey.....	3,046	100.0	2,688	100.0	Tennessee.....	2,175	100.0	2,161	100.0
Individual.....	1,852	60.8	1,674	62.3	Individual.....	918	42.2	1,116	51.6
Firm.....	450	14.8	449	16.7	Firm.....	789	36.3	753	34.8
Incorporated company.....	743	24.4	563	20.9	Incorporated company.....	459	21.1	282	13.1
Miscellaneous.....	1	(1)	2	0.1	Miscellaneous.....	9	0.4	10	0.5
New Mexico.....	99	100.0	85	100.0	Texas.....	2,022	100.0	1,920	100.0
Individual.....	51	51.5	52	61.2	Individual.....	1,087	53.8	1,117	58.2
Firm.....	18	18.2	15	17.6	Firm.....	401	19.8	457	23.8
Incorporated company.....	28	28.3	18	21.2	Incorporated company.....	524	25.9	339	17.6
Miscellaneous.....	2	2.0			Miscellaneous.....	10	0.5	7	0.4
New York.....	28,044	100.0	26,738	100.0	Utah.....	164	100.0	145	100.0
Individual.....	17,171	61.2	17,619	65.9	Individual.....	64	39.0	55	37.9
Firm.....	6,514	23.2	6,295	23.6	Firm.....	37	22.6	39	26.9
Incorporated company.....	4,082	14.6	2,630	9.8	Incorporated company.....	56	34.1	51	35.2
Miscellaneous.....	277	1.0	194	0.7	Miscellaneous.....	7	4.3		
North Carolina.....	2,245	100.0	2,274	100.0	Vermont.....	1,139	100.0	1,317	100.0
Individual.....	938	41.8	1,183	52.0	Individual.....	556	48.8	684	51.9
Firm.....	723	32.2	711	31.3	Firm.....	323	28.4	303	20.8
Incorporated company.....	583	26.0	376	16.5	Incorporated company.....	156	13.7	188	14.3
Miscellaneous.....	1	(1)	4	0.2	Miscellaneous.....	104	9.1	52	4.0
North Dakota.....	345	100.0	219	100.0	Virginia.....	1,822	100.0	1,863	100.0
Individual.....	190	55.1	137	62.6	Individual.....	991	54.4	1,142	61.3
Firm.....	61	17.7	42	19.2	Firm.....	550	30.2	525	28.2
Incorporated company.....	55	15.9	38	17.3	Incorporated company.....	275	15.1	188	10.1
Miscellaneous.....	39	11.3	2	0.9	Miscellaneous.....	6	0.3	8	0.4
Ohio.....	9,999	100.0	9,992	100.0	Washington.....	1,811	100.0	1,334	100.0
Individual.....	5,233	52.3	5,758	57.6	Individual.....	650	36.4	548	41.1
Firm.....	2,208	22.1	2,507	25.1	Firm.....	427	23.6	418	31.3
Incorporated company.....	2,510	25.1	1,700	17.0	Incorporated company.....	703	38.8	351	26.3
Miscellaneous.....	48	0.5	27	0.3	Miscellaneous.....	22	1.2	17	1.3
Oklahoma.....	390	100.0	190	100.0	West Virginia.....	1,099	100.0	1,001	100.0
Individual.....	218	55.9	101	53.2	Individual.....	486	44.2	513	51.2
Firm.....	74	19.0	51	26.8	Firm.....	387	35.2	369	36.9
Incorporated company.....	97	24.9	38	20.0	Incorporated company.....	224	20.4	118	11.8
Miscellaneous.....	1	0.2			Miscellaneous.....	2	0.2	1	0.1
Oregon.....	1,105	100.0	950	100.0	Wisconsin.....	5,410	100.0	5,051	100.0
Individual.....	514	46.5	484	51.0	Individual.....	2,512	46.4	2,591	51.3
Firm.....	316	28.6	289	30.4	Firm.....	1,064	19.7	1,067	21.1
Incorporated company.....	267	24.2	172	18.1	Incorporated company.....	1,240	22.9	1,014	20.1
Miscellaneous.....	8	0.7	5	0.5	Miscellaneous.....	594	11.0	379	7.5
Pennsylvania.....	17,002	100.0	16,850	100.0	Wyoming.....	95	100.0	85	100.0
Individual.....	10,323	60.7	10,760	63.8	Individual.....	42	44.2	37	43.5
Firm.....	3,461	20.4	3,866	23.0	Firm.....	17	17.9	27	31.8
Incorporated company.....	3,027	17.8	2,087	12.4	Incorporated company.....	35	36.8	21	24.7
Miscellaneous.....	191	1.1	137	0.8	Miscellaneous.....	1	1.1		

The industries selected as representative of the manufactures in the different states and territories comprised 140,364 establishments, or 64.9 per cent of the total number for the United States, at the census of 1905, and 135,695, or 65.4 per cent of the revised comparative total for 1900. Therefore they may be accepted as indicative of the changes in ownership for the principal industries in the country.

For the representative industries the proportion of the total number of establishments operated under individual ownership decreased in all but 8 states and territories, and the proportion operated by firms or companies decreased in all but 11, while the proportion operated by incorporated companies increased in all but 7. The states and territories in which the

corporate form of ownership has decreased and the individuals, firms, or companies have increased are comparatively unimportant in manufactures.

To further illustrate this change in character of ownership, Table x presents a comparison of the statistics for 15 of the important factory industries for which the same methods were followed in the enumeration at both censuses.

Table x confirms the conclusion that the number and the value of products of the establishments operated by incorporated companies were considerably greater for the census year 1905 than for the census year 1900, and that a relative decrease occurred in the number and magnitude of establishments owned by partnerships and firms or by individuals.

MANUFACTURES.

TABLE X.—NUMBER OF ESTABLISHMENTS AND VALUE OF PRODUCTS FOR FIFTEEN SELECTED

INDUSTRY.	Census.	TOTAL.		INDIVIDUAL.			
		Number of establishments.	Value of products.	Establishments.		Products.	
				Number.	Per cent.	Value.	Per cent.
1 Agricultural implements.....	1905	648	\$112,007,344	200	30.9	\$2,584,031	2.3
2	1900	715	101,207,428	251	35.1	2,464,808	2.4
3 Boots and shoes.....	1905	1,316	320,107,458	456	34.6	(1)	-----
4	1900	1,599	258,909,580	622	38.9	(1)	-----
5 Cheese, butter, and condensed milk.....	1905	8,926	168,182,789	3,817	42.8	43,919,430	26.1
6	1900	9,242	130,783,349	4,509	48.8	43,879,011	33.5
7 Clothing, men's.....	1905	4,504	355,796,571	2,728	60.6	61,893,733	17.4
8	1900	5,729	276,717,357	4,057	70.8	52,148,361	18.8
9 Clothing, women's.....	1905	3,351	247,661,560	1,600	47.8	73,020,366	29.5
10	1900	2,701	159,339,539	1,454	53.8	54,756,420	34.4
11 Cotton goods.....	1905	1,077	442,451,218	96	8.9	11,309,388	2.6
12	1900	973	332,806,156	142	14.6	16,663,782	5.0
13 Furniture.....	1905	2,482	170,446,825	822	33.1	22,390,538	13.1
14	1900	1,814	125,315,986	597	32.9	19,495,444	15.6
15 Glass.....	1905	399	79,607,998	21	5.3	1,234,551	1.5
16	1900	355	59,539,712	29	8.2	2,287,035	4.0
17 Hosiery and knit goods.....	1905	1,079	136,558,139	338	31.3	21,040,297	15.4
18	1900	921	95,482,566	353	38.3	19,053,234	20.0
19 Leather, tanned, curried, and finished.....	1905	1,049	252,620,986	367	35.0	(1)	-----
20	1900	1,306	204,038,127	635	48.6	(1)	-----
21 Millinery and lace goods.....	1905	860	50,777,768	432	50.2	14,352,907	28.3
22	1900	591	29,499,406	330	55.8	9,818,362	33.3
23 Printing and publishing, newspapers and periodicals.....	1905	18,038	309,327,606	10,845	60.1	56,949,288	18.4
24	1900	15,305	222,983,569	9,759	63.8	56,520,752	25.3
25 Tobacco, chewing and smoking, and snuff.....	1905	433	116,767,630	217	50.1	4,230,977	3.6
26	1900	437	103,754,362	197	45.1	6,433,463	0.2
27 Woolen goods.....	1905	792	142,196,658	236	29.8	19,624,950	13.8
28	1900	1,035	118,430,158	426	41.2	20,504,514	17.3
29 Worsted goods.....	1905	226	165,745,052	43	19.0	11,110,638	6.7
30	1900	186	120,314,344	43	23.1	11,980,156	10.0

¹ Omitted to avoid disclosing individual operations.

ESTABLISHMENTS AND CHARACTER OF OWNERSHIP.

lix

INDUSTRIES, BY CHARACTER OF OWNERSHIP, WITH PER CENT IN EACH CLASS: 1905 AND 1900.

FIRM.				INCORPORATED COMPANY.				MISCELLANEOUS.			
Establishments.		Products.		Establishments.		Products.		Establishments.		Products.	
Number.	Per cent.	Value.	Per cent.	Number.	Per cent.	Value.	Per cent.	Number.	Per cent.	Value.	Per cent.
121	18.7	\$4,097,433	3.7	327	50.4	\$105,325,880	94.0				
169	23.6	15,318,989	15.2	295	41.3	83,423,031	82.4				
383	29.1	89,644,551	28.0	476	36.2	199,849,004	62.4	1	0.1	(1)	
578	36.1	105,974,638	40.9	398	24.9	117,511,212	45.4	1	0.1	(1)	
1,291	14.5	22,653,536	13.5	1,385	15.5	61,309,538	36.4	2,433	27.2	\$40,300,276	24.0
1,340	14.5	18,530,563	14.2	1,628	17.6	44,027,214	33.7	1,765	19.1	24,337,561	18.0
1,354	30.1	197,932,448	55.6	420	9.3	(1)		2	(2)	(1)	
1,428	24.9	171,883,511	62.1	243	4.3	(1)		1	(2)	(1)	
1,428	42.6	128,447,083	51.9	310	9.5	46,168,946	18.6	4	0.1	25,165	(2)
1,117	41.4	89,440,670	56.1	129	4.8	(1)		1	(2)	(1)	
100	9.3	(1)		880	81.7	411,418,181	93.0	1	0.1	(1)	
123	12.6	17,105,277	5.1	708	72.8	299,037,097	89.9				
509	22.9	24,811,357	14.6	1,087	43.8	123,052,406	72.2	4	0.2	192,524	0.1
545	30.0	28,802,660	23.0	669	36.9	76,827,957	61.3	3	0.2	189,925	0.1
26	6.5	2,610,890	3.3	337	84.5	74,830,170	94.0	15	3.7	917,387	1.2
60	16.9	7,674,113	13.6	259	72.9	46,033,245	81.4	7	2.0	545,319	1.0
263	24.4	29,204,005	21.4	475	44.0	86,303,316	63.2	3	0.3	10,521	(2)
252	27.4	24,256,815	25.4	312	33.9	52,143,384	54.6	4	0.4	29,133	(2)
260	27.0	62,397,239	24.7	361	37.3	168,736,461	66.8	1	0.1	(1)	
362	27.7	63,761,210	31.3	308	23.6	109,105,921	53.5	1	0.1	(1)	
323	37.6	26,068,989	51.3	105	12.2	10,355,872	20.4				
215	36.4	13,703,262	46.5	46	7.8	5,947,782	20.2				
3,214	17.8	31,736,283	10.3	3,463	10.2	216,840,895	70.1	516	2.9	3,801,140	1.2
2,994	19.0	33,789,475	15.2	2,378	15.5	129,570,557	58.1	174	1.1	3,102,785	1.4
89	20.6	4,752,481	4.1	127	29.3	107,784,172	92.3				
124	28.4	8,193,648	7.9	116	20.5	89,127,251	85.9				
202	25.5	(1)		352	44.4	102,127,113	71.8	2	0.3	(1)	
298	28.8	26,808,727	22.6	311	30.0	71,116,917	60.1				
52	23.0	25,394,317	15.3	131	58.0	129,240,097	78.0				
60	32.3	25,417,707	21.1	83	44.6	82,916,481	68.9				

* Less than one-tenth of 1 per cent.

MANUFACTURES.

The number of establishments and the value of products for each class of ownership in each industry are given in Table 9. The corresponding totals for the 14 groups of industries are given in Table xi.

TABLE XI.—NUMBER OF ESTABLISHMENTS AND VALUE OF PRODUCTS FOR GROUPS OF INDUSTRIES, BY CHARACTER OF OWNERSHIP: 1905.

GROUP.	TOTAL.		INDIVIDUAL.		FIRM.		INCORPORATED COMPANY.		MISCELLANEOUS.	
	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.
United States.....	216,262	\$14,802,147,087	113,961	\$1,702,980,808	47,942	\$2,132,619,830	51,156	\$10,912,080,421	3,203	\$54,466,028
Food and kindred products.....	45,790	2,845,234,900	28,268	457,281,987	8,848	415,080,749	6,195	1,930,717,140	2,479	42,155,024
Textiles.....	17,042	2,147,441,418	7,726	277,173,680	5,177	601,907,022	4,122	1,268,046,940	17	314,770
Iron and steel and their products.....	14,239	2,176,739,726	4,905	95,805,114	2,923	128,684,651	6,308	1,951,501,890	13	748,071
Lumber and its remanufactures.....	32,726	1,223,730,336	16,052	221,243,513	9,491	281,568,626	7,151	760,112,149	32	1,806,048
Leather and its finished products.....	4,945	705,747,470	2,176	(¹)	1,385	199,664,911	1,382	421,301,212	2	(¹)
Paper and printing.....	30,787	857,112,256	17,727	132,550,689	5,857	99,499,731	6,667	619,823,284	536	5,238,552
Liquors and beverages.....	6,381	501,266,005	3,438	46,001,427	1,270	31,080,397	1,668	424,081,508	5	97,183
Chemicals and allied products.....	9,680	1,031,905,263	2,854	60,790,472	1,800	87,764,433	4,902	881,915,342	64	1,495,016
Clay, glass, and stone products.....	10,775	391,230,422	4,461	52,642,387	2,892	55,473,182	3,388	281,920,789	34	1,185,064
Metals and metal products, other than iron and steel.....	6,310	922,262,456	2,809	59,190,109	1,710	79,161,137	1,787	783,394,162	4	517,048
Tobacco.....	16,828	331,117,681	14,116	82,902,596	2,145	60,015,581	533	188,180,069	4	13,435
Vehicles for land transportation.....	7,285	643,924,442	3,453	36,816,883	1,518	29,242,357	2,311	577,128,703	3	736,499
Shipbuilding.....	1,097	82,769,239	673	8,932,284	224	5,945,180	200	67,891,775	.....	.....
Miscellaneous industries.....	12,377	941,604,873	5,303	(¹)	2,642	107,525,873	4,422	746,961,362	10	(¹)

¹ Omitted to avoid disclosing individual operations.

Table xii shows, for each of the 14 groups of industries, the percentages that the number of establishments and the value of products form of the corresponding totals for each class of ownership. Table xiii shows the percentages that the same items for each class of ownership form of the corresponding totals for each of the 14 groups.

To show the true importance of the establishments under the several classes of ownership, the statistics for

capital, employees, wages, materials, and products at the census of 1905 were compiled for each, and are shown in detail for the principal industries in each state and territory in Part II of the Report on Manufactures, census of 1905. The totals for all industries in each state are given in Table 8, and Table xiv is a summary which reproduces the totals for the United States.

TABLE XII.—RATIO OF EACH CLASS OF OWNERSHIP IN EACH GROUP TO TOTAL FOR CLASS OF OWNERSHIP: 1905.

GROUP.	TOTAL.		INDIVIDUAL.		FIRM.		INCORPORATED COMPANY.		MISCELLANEOUS.	
	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.
United States.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Food and kindred products.....	21.2	19.2	24.8	26.8	18.4	19.5	12.1	17.7	77.4	77.4
Textiles.....	7.9	14.5	6.8	16.3	10.8	28.2	8.1	11.0	0.5	0.6
Iron and steel and their products.....	6.6	14.7	4.3	5.6	6.1	6.0	12.5	17.9	0.4	1.4
Lumber and its remanufactures.....	15.1	8.3	14.1	13.0	19.8	10.9	14.0	7.0	1.0	3.3
Leather and its finished products.....	2.3	4.8	1.9	(¹)	2.9	9.4	2.7	3.9	0.1	(¹)
Paper and printing.....	14.2	5.8	15.6	7.8	12.2	4.7	13.0	5.7	16.7	9.6
Liquors and beverages.....	2.9	3.4	3.0	2.7	2.6	1.4	3.3	3.9	0.2	0.2
Chemicals and allied products.....	4.5	7.0	2.5	3.6	3.9	4.1	9.6	8.1	2.0	2.7
Clay, glass, and stone products.....	5.0	2.6	3.9	3.1	6.0	2.6	6.6	2.6	1.1	2.2
Metals and metal products, other than iron and steel.....	2.9	6.2	2.5	3.5	3.6	3.7	3.5	7.2	0.1	0.9
Tobacco.....	7.8	2.2	12.4	4.9	4.5	2.8	1.1	1.7	0.1	(²)
Vehicles for land transportation.....	3.4	4.3	3.0	2.1	3.2	1.4	4.5	5.3	0.1	1.4
Shipbuilding.....	0.5	0.6	0.6	0.5	0.5	0.3	0.4	0.6	.....	.....
Miscellaneous industries.....	5.7	6.4	4.6	(¹)	5.5	5.0	8.6	6.8	0.3	(¹)

¹ Omitted to avoid disclosing individual operations.

² Less than one-tenth of 1 per cent.

ESTABLISHMENTS AND CHARACTER OF OWNERSHIP.

lxi

TABLE XIII.—RATIO OF EACH CLASS OF OWNERSHIP IN EACH GROUP TO TOTAL FOR GROUP: 1905.

GROUP.	TOTAL.		INDIVIDUAL.		FIRM.		INCORPORATED COMPANY.		MISCELLANEOUS.	
	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.
United States.....	100.0	100.0	52.7	11.5	22.2	14.4	23.6	73.7	1.5	0.4
Food and kindred products.....	100.0	100.0	61.8	16.1	19.3	14.6	13.5	67.8	5.4	1.5
Textiles.....	100.0	100.0	45.3	12.9	30.4	28.0	24.2	50.1	0.1	(¹)
Iron and steel and their products.....	100.0	100.0	34.5	4.4	20.5	5.9	41.9	89.7	0.1	(¹)
Lumber and its manufactures.....	100.0	100.0	49.0	18.1	20.0	18.9	21.9	62.0	0.1	0.1
Leather and its finished products.....	100.0	100.0	44.0	(²)	28.0	28.3	28.0	59.7	(¹)	(²)
Paper and printing.....	100.0	100.0	57.6	15.5	19.0	11.6	21.7	72.3	1.7	0.6
Liquors and beverages.....	100.0	100.0	53.0	9.2	19.9	6.2	28.1	84.6	0.1	(¹)
Chemicals and allied products.....	100.0	100.0	29.5	5.9	19.2	8.5	50.6	85.5	0.7	0.1
Clay, glass, and stone products.....	100.0	100.0	41.4	13.4	26.3	14.2	31.5	72.1	0.3	0.3
Metals and metal products, other than iron and steel.....	100.0	100.0	44.5	6.4	27.1	8.6	28.3	84.9	0.1	0.1
Tobacco.....	100.0	100.0	83.9	25.1	12.3	18.1	3.3	56.8	(¹)	(¹)
Vehicles for land transportation.....	100.0	100.0	47.4	5.7	20.8	4.6	31.7	89.6	0.1	0.1
Shipbuilding.....	100.0	100.0	61.4	10.8	20.4	7.2	18.2	82.0	.....	.....
Miscellaneous industries.....	100.0	100.0	42.8	(²)	21.4	11.4	35.7	79.3	0.1	(²)

¹ Less than one-tenth of 1 per cent.

² Omitted to avoid disclosing individual operations

TABLE XIV.—SUMMARY FOR ESTABLISHMENTS, BY CHARACTER OF OWNERSHIP, WITH PER CENT IN EACH CLASS: 1905.

CHARACTER OF OWNERSHIP.	ESTABLISHMENTS.		CAPITAL.		WAGE-EARNERS AND WAGES.				MISCELLANEOUS EXPENSES.		COST OF MATERIALS USED.		VALUE OF PRODUCTS.	
	Number.	Per cent.	Amount.	Per cent.	Average number.	Per cent.	Wages.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.
United States.....	216,262	100.0	\$12,686,265,673	100.0	5,470,321	100.0	\$2,611,540,532	100.0	\$1,455,019,473	100.0	\$8,503,919,756	100.0	\$14,802,147,087	100.0
Individual.....	113,961	52.7	965,831,738	7.6	755,972	13.8	346,850,219	13.3	146,990,869	10.1	878,595,541	10.3	1,702,980,808	11.5
Firm.....	47,942	22.2	1,188,892,836	9.4	841,280	15.4	380,332,213	14.5	198,934,017	13.7	1,202,420,608	14.1	2,132,610,830	14.4
Incorporated company.....	51,156	23.6	10,510,811,355	82.8	3,864,649	70.6	1,879,559,045	72.0	1,106,189,403	76.0	6,381,670,469	75.1	10,612,080,421	73.7
Miscellaneous.....	3,203	1.5	20,729,744	0.2	8,520	0.2	4,798,455	0.2	2,905,184	0.2	41,263,138	0.5	54,466,028	0.4

Individual ownership.—The number of establishments operated under individual ownership was largely in excess of the number for any of the other classes of control at both censuses. At the census of 1900 when the hand trades and neighborhood and mechanical industries were included, 512,254 establishments were reported, and of this number 372,703, or 72.8 per cent, were operated by individual owners, while at the census of 1905, when 216,262 establishments were reported, 113,961, or 52.7 per cent, were operated by individuals. The reduction of establishments resulting from the elimination of the neighborhood and mechanical industries was greater for this than for any other class of ownership.

A decrease is shown in the proportion of products for establishments operated under this class of ownership in each of the selected industries for which the value of products is given in Table x, the greatest decrease, 7.4 per cent, occurring in the manufacture of cheese, butter, and condensed milk. With the exception of the manufacture of furniture and chewing and smoking tobacco and snuff, a decrease is also shown for the proportion of establishments in each of the industries in the table.

Individual ownership is a characteristic of small establishments, and therefore, while the number of es-

tablishments for this form of ownership exceeds the number for other forms, the magnitude of operations is considerably less. This statement is substantiated by Table viii, which shows that the value of the product for establishments in this class formed only 15.7 per cent of the total value of products for all manufacturing and mechanical industries except the hand trades and 9 additional industries at the census of 1900, and only 11.5 per cent for the factory industries at the census of 1905. Moreover, although more than half of the manufacturing establishments of the country were operated under individual ownership at the latter census, Table xiv shows that they controlled only 7.6 per cent of the capital, gave employment to only 13.8 per cent of the wage-earners, and paid only 13.3 per cent of the aggregate wages. Therefore, aside from the number of establishments, the operations of the individual employer in the factory industries of the country is of comparatively small importance. In no state or territory do the operations of such establishments approach in magnitude those of the establishments controlled by incorporated companies. In 33 states and territories, however, the establishments of this class gave employment to a larger number of wage-earners than were reported for firms, and in 28 the value of their products exceeded that for the firms. Exceed-

ing the industries for which no firms were reported, the value of products for establishments operated by individual owners was in excess of the total for firms in 161 industries, and in 40 it was in excess of the total for incorporated companies. While individual ownership was reported for practically all of the industries at the census of 1905, the largest proportion of such owners were engaged in the manufacture of food and kindred products, the 28,268 establishments operated by individuals in this group forming 24.8 per cent of the number so operated for all branches of industry. But from the percentages given in Table XIII it appears that individual ownership controlled the largest proportion (83.9 per cent) of establishments in the tobacco industry. This is due to the inclusion of reports for a large number of individual operators who manufacture cigars.

Firms and limited partnerships.—This form of ownership includes all firms and partnerships, whether general or limited. Although there are many large manufacturing establishments operated by firms, the limitations imposed by law upon the partnership render it unsuitable for great industrial enterprises. Each member of the ordinary partnership is liable for the debts of the partnership to the full extent of his resources, and the death of a partner operates, ipso facto, as a dissolution of the partnership with the consequent necessity of an immediate adjustment of the firm's affairs, which often results in the withdrawal of capital at a most inconvenient and critical period. This lack of stability prevents the formation of great combinations under this character of organization and renders the participation of a large number of investors impracticable.

Midway between the partnership and the corporation is the limited partnership. This form of ownership is composed of two groups of partners, one engaging actively in the management of the business and incurring the unlimited liabilities of the ordinary partnership, and the other having no active control but furnishing the capital with a liability limited to the amount invested. While this is a step in advance of the ordinary partnership, the feature of unlimited liabilities still remains to prevent its adequate development for industrial enterprises.

However, as each partner contributes to the enterprise, a larger accumulation of capital is usual than in the case of the individual owner. The average establishment operated by the firm or partnership reported a capital of \$24,799, and an annual product valued at \$44,483 as compared with \$8,475 and \$14,944, respectively, for that operated by the individual.

Of the 512,254 establishments, including the mechanical and neighborhood industries, reported at the Twelfth Census, 96,715, or 18.9 per cent, were operated under this form of ownership. There were 47,942 establishments, or 22.2 per cent, reported for this class at the census of 1905.

The number of establishments operated by firms was less in every state than the number operated by individuals, but the proportion of the value of products for such establishments exceeded that of establishments controlled by individuals in 22 states, while the values for the two forms of ownership were equal in 1 state. The excess is noticeable in the large manufacturing states, such as New York, Pennsylvania, Illinois, Massachusetts, and Ohio.

Establishments operated by firms or partnerships existed in all but 16 of the 339 industries. In 6 industries they predominated in the number of establishments; in 3, in both the number of establishments and the value of products; and in 23 others, in the value of products.

As shown in Table XII, the group with the largest proportion of establishments controlled by firms, 19.8 per cent, was lumber and its remanufactures, and that with the largest proportion of products made in such establishments, 28.2 per cent, was textiles. The firm is a popular form for the ownership of the smaller lumber mills. The larger proportion for the value of products in the manufacture of textiles is due primarily to the extensive establishments engaged in the manufacture of clothing. As shown by the percentages in Table X, the products for 1905 of the firms formed 55.6 per cent of the total for all establishments engaged in the manufacture of men's clothing and 51.9 per cent for those manufacturing women's clothing. The same table indicates that a decrease took place in the proportional product for all but one of the selected industries for which the values are shown. The proportion for that one—millinery and lace goods—increased from 46.5 per cent. to 51.3 per cent.

Incorporated companies.—As indicated above, the partnership and individual forms of ownership are not efficient agents under modern conditions for the best development of industry, and the corporation has been created by law to supply their deficiencies. The right to exercise corporate powers is a franchise granted in this country by the legislatures of the different states. This grant may take the form of either a special charter or a general law under which individuals may voluntarily combine and take to themselves corporate powers in accord with the provisions of the law. There are many variations in the general corporation laws of the different states, but common to all is the provision that insures the perpetual succession of members. In the ordinary industrial corporation this is obtained by means of interests represented by shares which are transferable at the option of the holder, whose rights pass to the assignee upon the recording of the transfer. Thus, unlike the partnership, continuity of existence is guaranteed and the stockholder can lose nothing beyond the investment which his holdings represent. These characteristics have rendered the corporation the most useful and, in fact, an essential instrument for

the exploitation of great industrial projects, and have made possible tremendous aggregations of capital.

Wherever large capital may be employed to advantage and economies of production are made possible by concentration of management and the control of allied industries, the corporation has practically supplanted all other forms of ownership. The principal industries of the country owe their great development very largely to the influence of corporations. It is not strange, therefore, that from every standpoint of statistical measurement, except the number of establishments, this form of ownership should be the most important. The establishments operated by corporations produced 59.5 per cent of the value of all products, including those of the hand trades and neighborhood industries, at the census of 1900, and 73.7 per cent for those included in the factory census of 1905. Furthermore, Table XIV shows that at the latter census corporations furnished 82.8 per cent of the capital, employed 70.6 per cent of the total number of wage-earners, paid 72 per cent of the wages, and expended 75.1 per cent of the total cost of materials.

The proportion of the product manufactured by incorporated companies increased in each of the selected industries for which the value of products is given in Table X. The greatest increase, 17 per cent, is shown for the manufacture of boots and shoes.

South Dakota was the only state in which the value of products of establishments controlled by incorporated companies formed less than 50 per cent of the total for all establishments. For Alaska, Arizona, and 14 states the value of products of incorporated companies formed more than 80 per cent of the total value. Exclusive of the industries for which no corporations were reported the value of products for incorporated companies exceeded the value for either of the other forms of ownership in all but 49 of the 339 industries shown in the general tables. In number the corporations exceeded the individuals and the firms in 167 industries and in 9 industries they manufactured the entire product.

Miscellaneous ownership.—This class of ownership is relatively of small importance when compared with any of the other forms of organization. It is of especial interest, however, because most of the establishments included in it are operated by cooperative associations, whose organization involves a radical change in the industrial system. Productive cooperative associations are capitalized and controlled by the operatives. They have made little impression upon industrial life in this country, and, except in isolated cases, are confined to industries requiring small capital and presenting few of the operating difficulties of a modern factory.

Because of the comparatively simple processes usually involved in the manufacture of food preparations from farm products, it is not surprising that cooperative associations are most numerous in the "food and kindred products" group. Of the 3,203 establishments tabulated under miscellaneous ownership in Table XI, 2,479, or 77.4 per cent, were in the "food and kindred products" group, and of these, 2,433 were engaged in the manufacture of butter and cheese. Cooperative creameries are the most numerous examples of productive cooperation in this country and in 1905 were reported in 31 states, forming in several, notably Minnesota, Iowa, Wisconsin, and Pennsylvania, a large percentage of the total number of establishments engaged in the production of butter and cheese. The majority of such establishments have certain joint-stock and certain cooperative features, and the shareholders are generally farmers who band themselves together for the purpose of furnishing a steady market for their milk and escaping the heavy losses occasioned by irresponsible milkmen. Table 9 shows that the average value of products for creameries operated under the cooperative system is less than the average value for those controlled by the other forms of organization.

Another feature of the cooperative creameries is the small salaries reported for salaried officials. These officials are generally members of the cooperative association, who give but a small part of their time to work in connection with the association.

Profit sharing is often erroneously spoken of as a form of cooperation. Cases of profit sharing are frequent in this country, but none presents the essential features of true cooperation. Generally profit sharing is the result of business policy and does not alter the form of organization which existed before the feature was introduced. It is really extra wages paid to labor out of the profits as an incentive for the economical use of materials and greater productivity, without changing the relationship of employer and employee. Therefore such cases relate to forms of ownership other than cooperative and few, if any, will be found in the miscellaneous group. Probably a number of productive cooperative associations have incorporated and consequently are lost to the miscellaneous group, since they are classed with corporations.

The other forms of ownership which comprise the miscellaneous class were principally societies—fraternal, college, etc.—printing and publishing newspapers and periodicals. In 1900 there were 174 such societies with a product valued at \$3,102,785, which increased to 516 establishments with a product of \$3,801,140 at the census of 1905.

CHAPTER IV.

CAPITAL.

It is impossible to formulate an inquiry for capital that can be satisfactorily applied to all branches of manufactures in a general industrial census. With slight modification, the inquiry of the Eleventh Census was used at the censuses of 1900 and 1905. This inquiry was designed to develop the full amount of capital both owned and borrowed, and while the statistics obtained by its application are not as definite as the

data for other subjects covered by the census, it is doubtful if more nearly accurate totals could be secured by the use of any other series of questions. The use of the same form of inquiry at the different censuses has the great advantage of obtaining results that are comparable. The inquiry, with its accompanying instructions, was as follows:

3. **Capital invested—owned and borrowed:** The answer must show the total amount of capital, both owned and borrowed. All the items of fixed and live capital may be taken at the amounts carried on the books. If land or buildings are rented, that fact should be stated and no value given. If a part of the land or buildings is owned, the remainder being rented, the fact should be stated, and only the value of the owned property given. The value of all items of live capital, bills receivable, unsettled ledger accounts, materials on hand, stock in process of manufacture, finished products and cash on hand, etc., should be given as of the last day of the business year reported.

Land	\$
Buildings	\$
Machinery, tools, and implements	\$
Bills receivable, unsettled ledger accounts, raw materials, stock in process of manufacture, finished products and cash on hand, and other sundries	\$
TOTAL CAPITAL	\$

Defects in the statistics.—The defects in the statistics of capital are frequently referred to in the Census reports. They are given in detail in the report of the Twelfth Census¹ and may be summarized as follows:

1. It is impossible to define the word "capital" for statistical measurement so that the thing measured shall be tangible, restricted, and uniform.

2. The value of "fixed capital"—land, buildings, and machinery—is dependent upon conditions of which a census can take no cognizance.

3. The difficulties attending the collection of statistics for live capital—cash on hand, bills receivable, unsettled accounts, etc.—preclude the possibility of reliable results.

4. It is impossible to eliminate the duplications in gross assets and in credit capital.

5. Good will, patents, mining rights, etc., are forms of capital for which no satisfactory value can be obtained.

6. Many manufacturing companies have investments other than those required to carry on the manufacturing operations, such as railroads and steamships and timber lands, and it is impossible to segregate the capital that pertains strictly to manufacturing.

7. Many corporations contend that they have but one capital account and it relates to the value of the capital stock and bonds, and therefore it is impossible to make a report of the actual or commercial value of their property as distinct from its earning capacity and other features which are considered in fixing the capitalization.

On the theory that relatively the same defects, omissions, and duplications occur in the statistics of capital at the different censuses, the totals may be accepted as indicating the increase, although they do not represent the actual value of capital invested in all branches of manufactures. The total for the census of 1905 was \$12,686,265,673 and the revised total for 1900 was \$8,978,825,200, an increase of \$3,707,440,473, or 41.3 per cent. The 304,692 establishments reported at the census of 1900 as engaged in the mechanical and neighborhood industries which were omitted from the census of 1905, had a capital of \$838,609,599. Only the total capital was revised for the census of 1900 and it is impossible to make a comparison of the amounts for land, buildings, machinery, etc., with those for the factory census of 1905, but the statistics are shown separately for each item at the latter census in Table xv, which also gives the percentage that each item forms of the total.

¹ Twelfth Census, Manufactures, Part I, page xcvi.

TABLE XV.—*Capital invested: 1905.*

	Amount.	Per cent of total.
Total.....	\$12,686,265,673	100.0
Land.....	980,550,625	7.7
Buildings.....	1,096,125,808	15.8
Machinery, tools, and implements.....	3,489,759,836	27.5
Cash and sundries.....	6,219,829,404	49.0

In accordance with the practice of former censuses the value of rented property was omitted from the report of 1905. The rent paid for land, buildings, and machinery, exclusive of the rent of offices, amounted to \$73,267,209. If this gross rent were capitalized at 8 per cent, it would represent \$915,840,112 as the value of rented property, which, added to the capital, gives an aggregate of \$13,602,105,785.

The exclusion of the capital for the group of "hand trades" and 9 industries omitted from the census of 1905 from the total for the census of 1900 leaves a capital of \$9,343,675,622, of which land formed 10.5 per cent, buildings 14.8 per cent, machinery, tools, and implements 26.3 per cent, and cash and sundries 48.4 per cent. While the inclusion in this total of 66,143 establishments of the class omitted from the census of 1905 destroys the value of a comparison of the figures to show the increase or decrease in the amounts, the percentages indicate that there has been a decrease in the proportional value of land and an increase in that for each of the other items of capital.

The Census statistics of capital are too general and contain too many defects and uncertainties to justify their use in computing the average amount of capital required for a product of a given value. They may be accepted as showing in a general way that the ratio of capital to product has been increasing, and that industries in which large and costly machinery is employed require a larger ratio of capital to product than the industries where the machinery is limited or the processes are comparatively simple. The omission of the neighborhood and mechanical industries confines the statistics to industries in which machinery is more generally employed, and it follows that a larger proportion of capital is shown for buildings and machinery than is indicated by the totals for prior censuses, which were not limited in this manner.

In addition to the uncertainties attending the statistics of capital, the comparison of the reports of the same establishment for the censuses of 1900 and 1905 made it evident that in a number of cases amounts had been reported for capital that are entirely out of proportion with all other statistics returned by the

same establishment. In some instances establishments employing practically the same number of wage-earners, paying about the same amount in wages, and manufacturing products of nearly the same value in 1905 and in 1900, reported a very large increase or decrease in the capital invested. The amounts, however, were certified by the manufacturers as correct, and in the absence of other information they were accepted by the Office. Increases in capital which are apparently inconsistent with the increases in products have been reported where establishments were reorganized and recapitalized between the censuses. This is especially evident in cases where formerly independent plants have been brought under the same management during the period.

It is true that the radical change in the form of inquiry at the census of 1890 largely destroyed the utility of the statistics for comparison with prior censuses. Still, the conclusion is inevitable that the amount of capital invested in manufactures has been increasing more rapidly than the value of the products. When the totals for the censuses of 1900 and 1905 are considered, it appears that in 42 states and territories the capital increased at a greater ratio than the value of products and in 21 the excess was more than 20 per cent. In only 9 states and territories was the ratio of increase in products greater than the ratio of increase in capital. Exclusive of 7 industries in which capital increased and products decreased there were 88 industries shown in Table 1 in which the percentage of increase for capital was 20 per cent in excess of the percentage of increase in value of products, and only 35 in which the increase in products was in excess of the increase in capital by such a large ratio. A great variation in this respect is shown for the establishments in cities as compared with those in rural districts. For the former the capital increased 34.2 per cent and the value of products, 26.6 per cent; for the latter the capital increased 58.7 per cent and the value of products, only 37.4 per cent.

Tables xvi and xvii are comparative tables showing some of the striking inconsistencies in the increases in capital and value of products. These tables are presented to illustrate the lack of harmony in the statistics and to indicate the reasons why the totals should not be used to show the relation of capital to product.

Table xvi compares, for 1900 and 1905, the number of establishments, the total capital, the different items of capital, and the value of products for several industries showing a much larger ratio of increase for capital than for products.

MANUFACTURES.

TABLE XVI.—EIGHT SELECTED INDUSTRIES WITH A GREATER RATIO OF INCREASE IN CAPITAL THAN IN VALUE OF PRODUCTS, BY STATES AND CITIES: 1905 AND 1900.

INDUSTRY AND LOCATION.	Census.	Number of establishments.	CAPITAL.					Value of products.
			Total.	Land.	Buildings.	Machinery, tools, and implements.	Cash and sundries.	
Coke:								
Colorado.....	1905	13	\$3,128,136	\$30,200	\$43,297	\$3,029,639	\$25,000	\$1,723,276
	1900	9	928,874	27,700	95,325	768,882	42,467	1,213,561
Per cent of increase.....		44.4	236.8	9.0	154.6	296.9	141.1	42.0
Electrical machinery, apparatus and supplies:								
Pennsylvania.....	1905	80	58,393,011	2,674,606	4,419,640	5,455,045	45,843,720	26,257,569
	1900	63	20,967,587	302,348	2,406,873	2,924,209	15,274,157	19,112,065
Per cent of increase.....		27.0	178.5	638.2	83.6	86.5	200.1	37.4
Food preparations:								
New York.....	1905	156	16,953,773	739,453	1,588,844	1,450,735	13,174,741	11,408,030
	1900	123	3,333,790	259,000	753,100	620,909	1,709,751	7,405,641
Per cent of increase.....		26.8	408.6	185.5	111.0	133.7	674.6	54.1
Iron and steel forgings:								
Pennsylvania.....	1905	36	18,003,445	878,350	1,393,726	1,971,439	13,759,921	3,325,501
	1900	24	2,568,029	239,734	168,118	805,369	1,365,408	3,300,543
Per cent of increase.....		50.0	600.9	266.4	720.0	144.8	915.2	1.3
Iron and steel: ²								
New York.....	1905	29	63,497,095	4,197,830	17,067,809	25,409,384	10,822,072	29,802,136
	1900	30	12,183,806	1,715,094	2,494,419	2,711,409	5,202,944	13,858,553
Per cent of increase.....		13.3	421.2	144.8	584.2	837.1	219.6	115.5
New Jersey.....	1905	21	51,694,677	4,608,627	8,505,069	14,595,144	23,955,837	23,607,483
	1900	25	19,971,909	1,658,608	2,430,631	3,350,834	12,531,536	24,381,699
Per cent of increase.....		110.0	158.9	181.5	249.9	334.7	91.2	12.9
Rice, cleaning and polishing:								
Louisiana.....	1905	43	6,138,228	421,005	1,141,232	1,666,692	2,909,299	10,718,311
	1900	37	1,818,144	119,109	450,260	522,250	726,525	5,736,451
Per cent of increase.....		16.2	237.6	253.5	153.5	219.2	300.4	86.9
Tobacco, chewing and smoking, and snuff:								
Missouri.....	1905	17	51,784,817	389,151	2,271,453	913,641	48,210,572	27,836,422
	1900	22	7,020,479	307,050	1,508,905	956,199	4,188,325	25,161,446
Per cent of increase.....		122.7	637.6	26.7	44.8	1.4	1,051.1	10.9
St. Louis.....	1905	9	51,706,559	385,451	2,260,853	905,800	48,154,455	27,703,238
	1900	13	6,767,781	294,000	1,549,208	910,907	4,003,066	24,411,307
Per cent of increase.....		130.8	605.1	30.8	45.9	1.0	1,102.9	13.5
Kentucky.....	1905	54	21,268,822	178,500	877,218	925,779	19,287,325	13,117,000
	1900	59	3,485,793	80,938	580,984	726,263	2,091,618	14,948,192
Per cent of increase.....		18.5	510.2	105.3	51.0	27.5	822.1	112.3
Louisville.....	1905	21	20,072,797	145,162	746,801	774,844	18,405,900	11,635,367
	1900	24	2,894,099	65,240	511,074	633,813	1,684,872	13,693,700
Per cent of increase.....		112.5	593.4	122.5	40.1	22.3	992.4	115.0
Tobacco, cigars and cigarettes:								
Virginia.....	1905	95	12,480,175	52,690	502,374	846,968	11,078,143	6,105,930
	1900	89	789,261	25,330	80,800	230,062	444,079	4,843,641
Per cent of increase.....		6.7	1,499.5	108.0	521.8	268.2	2,394.6	26.1
Richmond.....	1905	26	9,833,393	34,650	417,432	693,385	8,687,926	4,417,544
	1900	22	521,839	15,095	63,125	213,094	230,525	4,389,745
Per cent of increase.....		18.2	1,784.4	129.5	561.3	225.4	3,668.8	0.6

¹ Decrease.² In 1905 includes establishments as follows: Iron and steel, blast furnaces, 9; iron and steel, steel works and rolling mills, 20.

The statistics for the manufacture of coke are confined to oven coke produced from bituminous coal and consumed largely in the manufacture of pig iron. It does not include gas-house coke obtained as a by-product in the manufacture of illuminating gas. The equipment of a number of the principal coke producing plants with extensive by-product ovens is one of the reasons for the large increase in capital. The by-product oven was introduced in the United States in 1893, and a number of such ovens have been installed since the census of 1900. The large increase in capital for the coke industry in Colorado shown by Table XVI occurred principally in the item of "machinery, tools, and implements," which includes the value of ovens, and was due to increased values represented by the equipment of one of the principal plants in the state.

During the past decade there has been an unprecedented development in the manufacture of electrical

machinery, and since 1900 a large amount of new capital has been invested in the industry. One of the principal companies engaged in the industry reported a large increase in capital, and it is possible that the new equipment had not been in operation long enough to produce a corresponding increase in product.

The excessive increase in capital shown for the manufacture of food preparations in New York is due primarily to the establishment of a very large plant at Niagara Falls since 1900.

The capital for the manufacture of iron and steel forgings in Pennsylvania increased 600.9 per cent while the value of products decreased 1.3 per cent. One of the large establishments reported for this industry at the census of 1905 was engaged primarily in the manufacture of railroad cars at the census of 1900. The change in the character of its products was not fully accomplished prior to the census year and resulted in

the assignment of a large capital to the industry without a correspondingly large product.

The excessive increase in capital invested in the iron and steel industry in New York is due in part to the establishment of a very large plant which was not in operation long enough during the census year to have a product commensurate with the investment. One or two of the large companies engaged in the manufacture of iron and steel in New Jersey contended that stock values were the only values that could be given for capital, and the amounts reported were very much in excess of the values for the Twelfth Census.

While the capital for "rice cleaning and polishing" in Louisiana shows a larger percentage of increase than the value of products, both items have increased rapidly since 1900, and the excessive increase in capital is due probably to the fact that in the rapid development sufficient time had not elapsed for capital and products to assume their normal relationship.

The capital reported at the census of 1905 for the manufacture of chewing and smoking tobacco and snuff in the state of Missouri was an increase of 637.6 per cent over the amount reported at the census of 1900, while the value of products increased only 10.9 per cent. Large increases in capital and comparatively small increases or actual decreases in value of products are shown for the same industry, and for the manufacture of cigars and cigarettes in the other localities given in the above table. The inconsistencies in the

capital and product reported for these two industries for the states and cities named in the table are so great that they affect the totals for all establishments engaged in the manufacture of tobacco, which increased from \$111,517,318 to \$323,983,501, or 190.5 per cent, in capital and from \$263,713,173 to \$331,117,681, or 25.6 per cent, in gross value of products. The abnormal increase in capital is due to the very large increase in the item of "cash and sundries." During the period between the censuses a number of the large companies engaged in this industry were reorganized, brought under the control of a single corporation, and recapitalized. It is probable that in preparing the Census reports the new management placed a higher valuation on the properties and possibly also included some assets under "cash and sundries" that were brought into existence through the reorganization. As explained above, there is a constant tendency on the part of corporations to equalize the values covered by the Census inquiry concerning capital with the value of their authorized capital stock and bonds, and it is possible that this may account in part for the large capital reported for the manufacture of tobacco at the census of 1905.

Table xvii compares, for 1900 and 1905, the number of establishments, the total capital, the different items of capital, and the value of products for several industries in certain states showing a much larger ratio of increase for value of products than for capital.

TABLE XVII.—FIVE SELECTED INDUSTRIES WITH A GREATER RATIO OF INCREASE IN VALUE OF PRODUCTS THAN IN CAPITAL, BY STATES AND CITIES: 1905 AND 1900.

INDUSTRY AND LOCATION.	Census.	Number of establishments.	CAPITAL.					Value of products.
			Total.	Land.	Buildings.	Machinery, tools, and implements.	Cash and sundries.	
Canning and preserving, fish:								
Maine.....	1905	141	\$2,144,690	\$105,685	\$494,275	\$484,555	\$1,060,175	\$5,055,091
	1900	117	8,481,056	137,355	740,315	2,046,117	5,558,269	4,770,733
Per cent of increase.....		20.5	174.7	123.1	133.2	176.3	180.9	5.8
Oregon.....	1905	25	1,653,097	340,387	376,286	417,948	522,476	2,577,746
	1900	24	2,658,642	127,522	1,539,129	363,795	528,196	1,788,809
Per cent of increase.....		4.2	135.4	166.9	175.6	13.8	11.1	44.1
Liquors, malt:								
Maryland.....	1905	21	6,486,090	570,094	2,474,323	1,440,909	2,000,759	4,907,063
	1900	16	13,857,323	589,246	9,952,309	1,484,183	1,831,585	4,133,797
Per cent of increase.....		31.2	153.2	13.3	175.1	12.9	9.2	20.2
Baltimore.....	1905	16	5,564,493	493,109	2,182,942	1,182,445	1,705,097	4,185,170
	1900	12	9,689,087	473,246	6,930,307	1,000,629	1,284,905	2,934,028
Per cent of increase.....		33.3	142.6	4.2	168.5	18.2	32.8	42.6
Smelting and refining, not from the ore:								
New Jersey.....	1905	13	5,469,325	745,959	789,839	868,140	3,065,387	7,034,139
	1900	8	2,161,964	140,830	261,666	1,585,400	1,774,068	460,224
Per cent of increase.....		62.5	153.0	429.7	201.9	145.2	1,661.0	1,390.1
Turpentine and resin:								
Alabama.....	1905	144	767,048	13,150	88,705	218,860	446,333	2,434,365
	1900	152	1,176,391	525,973	111,929	161,773	376,716	2,033,705
Per cent of increase.....		15.3	134.8	197.5	120.8	35.3	18.5	19.7
Florida.....	1905	406	2,939,275	63,253	443,185	663,681	1,769,156	9,901,905
	1900	366	5,526,618	3,206,099	488,376	562,172	1,260,971	6,460,605
Per cent of increase.....		10.9	140.8	198.0	19.3	18.1	30.3	53.1
Wire:								
New Jersey.....	1905	4	2,047,126	86,184	374,477	570,094	1,016,371	11,103,959
	1900	3	1,105,304	42,500	73,194	153,113	836,497	3,375,095
Per cent of increase.....		33.3	85.2	102.8	411.6	272.3	21.5	229.0

1 Decrease.

One of the largest companies engaged in the canning and preserving of fish in the state of Maine at the census of 1900 discontinued business during 1903. While some of the plants controlled by it were in operation during 1904 and were included in the census of 1905, the discontinuance of the company evidently resulted in a readjustment of the capital for the industry and caused the decrease shown in Table xvii. The decrease in the capital for this industry in the state of Oregon is due principally to the fact that one of the largest companies reported in 1900 was idle during the entire year of 1904. However, the active establishments in both states reported an increased production.

The capital reported for the manufacture of malt liquors in Maryland at the census of 1905 was a decrease of 53.2 per cent from the amount reported for 1900, while the product increased 20.2 per cent. This condition is due to the capital and products reported for the establishments in the city of Baltimore which changed ownership and were reorganized during the period between the censuses. Either some of the buildings were abandoned between 1900 and 1905, or the company placed a much lower valuation on its real estate at the last census than that given by the owners at the census of 1900.

The abnormal increase in the value of the product as compared with the capital in the industry of "smelting and refining, not from the ore," in New Jersey is due chiefly to the fact that one large establishment, classified at the census of 1900 as "smelting and refining, copper," made such a change in the character of its principal product that it was assigned to this industry at the census of 1905. A similar condition in the manufacture of wire in the same state is explained by the establishment of a very large plant during the time between the censuses. Both of these industries are of the character that permits of a rapid turning over of capital, and therefore do not require so large an investment for a given product as is necessary in other branches of manufactures. A large proportion of the establishments show a much smaller relative increase in capital than in products.

The decrease in the capital reported for the turpentine and rosin industry in Alabama and Florida is due largely to a change in Census methods. The estimated value of the turpentine orchards when owned by the distiller was included in the capital reported for

the census of 1900. The vast majority of the orchards were not owned by the operators of the distilleries, and the inclusion of their value for the comparatively few cases in which they were owned was misleading. In order to compile the data on uniform lines at the census of 1905, the land included in capital was confined to that on which the buildings were located and which was necessary to the actual operation of the distillery.

The explanations of the apparently inconsistent increases in capital and products shown in Tables xvi and xvii illustrate the different factors that should be considered in accepting the statistics. In addition to the inherent defects attending the application of any uniform series of questions to the collection of statistics of capital, the use of general Census methods is apt to lead to an overestimate of the capital by some and an underestimate by other manufacturers. Then, as previously explained, capital as reported to the Census does not include rented property. It is possible that these underestimates and overestimates of capital for the individual establishments counterbalance and the grand total comes near to reflecting actual conditions. The general understanding is that the universal use of machinery and the demands for production on a large scale at a minimum profit per unit have resulted in increasing the amount of capital required for a product of a given value. At any rate, the average amount of capital required for a product of \$100 as computed from the census totals for all branches of manufactures shows a constant increase from census to census except from 1860 to 1870, when values were disturbed by the depreciation in currency.

Capital stock of corporations.—Incorporated companies were requested to report the value of land, buildings, machinery, etc., as distinct from their capitalization, but a number contended that such a segregation was impracticable, and to be complete, the inquiry should be extended so as to cover the value of capital stock and bonds of incorporated companies. But many incorporated companies are engaged in other enterprises than manufacturing, and own other properties such as mines, railroads, and steamship lines. As a rule, the capitalization of such companies covers all of their investments and it is impossible to make a segregation of the value of the capital stock and bonds that would show the amounts represented by the plants devoted to manufacturing.

CHAPTER V.

EMPLOYEES AND WAGES AND TIME IN OPERATION.

PERSONS EMPLOYED, SALARIES, AND WAGES.

The inquiries concerning persons employed were formulated in greater detail than those for any of the other items of statistical information covered by the schedule, and every precaution was taken to secure results as accurate as Census methods would permit. In the past, for the purpose of increasing the accuracy and scientific value of the information collected, radical changes have been made in the form of the questions.

These changes and their effect upon the results of the censuses at which they occurred are explained on pages lxxxiii and lxxxiv. At the census of 1900, however, a great advance was made over all previous attempts in this direction, with the result that the census of 1905 has produced for the first time statistics of persons employed which are comparable in every essential particular with the figures of the preceding census.

Form of inquiry.—The inquiries used at the census of 1905 were as follows:

4. **Proprietors and firm members:** Men, number..... Women, number.....
Give the number of proprietors and firm members, including both active and silent partners. Do not include stockholders of corporations.

5. Salaried employees:	Number.	Total amount paid in salaries during the year.
Salaried officers of corporations.....		\$.....
Superintendents, managers, foremen, clerks, and other salaried employees:		
Men.....		\$.....
Women.....		\$.....
TOTAL.....		\$.....

6. Wage-earners, including pieceworkers: Do not include salaried employees reported above.	Greatest number employed at any one time during the year.	Least number employed at any one time during the year.	Total amount paid in wages during the year.
Men 16 years and over.....			\$.....
Women 16 years and over.....			\$.....
Children under 16 years.....			\$.....
TOTAL.....			\$.....

Salaries and wages should include board or rent furnished as part compensation. Foremen receiving wages and performing work similar to that of the men over whom they have charge are to be reported as wage-earners. If books do not show the separate amount of wages paid to men, women, and children, apportion the total wages for the year upon the basis of an average pay roll. Amounts paid for contract work, if not done by the regular employees, must not be included here, but reported in answer to Inquiry 8.

7. **Average number of wage-earners, including pieceworkers, employed during each month:**
Do not include proprietors and firm members, or salaried officers, superintendents, managers, foremen, or clerks.

MONTH.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.	MONTH.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.
January.....				July.....			
February.....				August.....			
March.....				September.....			
April.....				October.....			
May.....				November.....			
June.....				December.....			

MANUFACTURES.

11. Classified earnings of wage-earners, including pieceworkers, for the week during which the largest number of persons was employed: For week ending1904.

Distribute employees according to actual earnings (not rates) for one week only. If period of payment includes two weeks, or any time other than one week, reduce the pay roll to a weekly basis before entering the figures for this inquiry. Do not include proprietors, firm members, officials, superintendents, managers, foremen, or clerks.

EARNINGS PER WEEK.	Total.	Men 16 years and over, number.	Women 16 years and over, number.	Children under 16 years, number.
Under \$3 per week.....
\$3 and over, but under \$4.....
\$4 and over, but under \$5.....
\$5 and over, but under \$6.....
\$6 and over, but under \$7.....
\$7 and over, but under \$8.....
\$8 and over, but under \$9.....
\$9 and over, but under \$10.....
\$10 and over, but under \$12.....
\$12 and over, but under \$15.....
\$15 and over, but under \$20.....
\$20 and over, but under \$25.....
\$25 and over.....
TOTAL NUMBER.....
TOTAL WAGES FOR THE WEEK.....	\$.....	\$.....	\$.....	\$.....

These inquiries—save Inquiry 11—were identical with the questions used at the census of 1900, except that the inquiry of 1900 called for the “greatest” and “least number employed at any one time during the year,” of “proprietors and firm members,” “salaried officers of corporations,” and “general superintendents, managers, clerks, and salesmen,” respectively, while the inquiry of 1905 relating to salaried employees called for only the number in each of these classes. But although the inquiries themselves were practically the same, the arrangement was different. In 1900 all the questions concerning persons employed were arranged under a common head and the separate totals added to a single aggregate; whereas in 1905 each group—that composed of proprietors and firm members, the salaried group, and the wage-earning group—was listed separately, with distinct totals as indicated above.

The instructions concerning answers to the inquiries at the census of 1900 differed slightly from those of 1905, and were given on the last page of the schedule and not in immediate connection with the inquiry, as at the latter census. They were as follows:

Inquiry 5—Persons employed.—Account for all persons engaged in the business, both in the management and in production. Give the total salaries and wages paid, which should include board or rent furnished as part compensation. Give the number of proprietors and firm members, and, if they are not paid salaries, so state on the schedule. Stockholders of corporations are not to be reported unless they are salaried officials. Amounts paid for outside contract work must not be included in the wages, but be reported in answer to Inquiry 8.

No inquiry was made at the census of 1900 to correspond with Inquiry 11, “Classified earnings of wage-earners,” at the census of 1905. Statistics derived from Inquiry 11 will be made the subject of a separate report.

Changes in 1900.—Because of changes made in 1900 in the form of inquiries covering salaried employees

and wage-earners, comparisons with previous censuses are of slight value. The result of these changes, with reference to comparisons with the census of 1890, was fully explained in the Twelfth Census Report on Manufactures,¹ as follows:

Changes in form of inquiry.—The principal changes in the form of the inquiry were three in number:

I. General superintendents and managers, many of whom, owing to a misunderstanding of the schedule, were included in the class of skilled workmen in 1890, were reported in 1900 with other salaried employees, except salaried officers of corporations, who formed a separate group.

II. Proprietors and firm members were eliminated from the class of salaried officials, and reported separately without salaries.²

III. The schedules of 1890 made no provision for reporting the average number of employees for each month, and the average number was in most cases based upon the actual time each establishment was in operation, and not upon the entire twelve months of the year, as was the case in 1900.

The first of these changes has affected all classes of industries, but the exact results of the change can not be established by deduction from the statistics presented. Many of the general superintendents and managers, and their salaries, were included in the first item on the schedule for employees and wages in 1900, which called for operatives, engineers, and other skilled workmen; overseers, foremen, or superintendents (not general superintendents or managers). No provision was made elsewhere for “general superintendents or managers,” except as they were inferentially called for under the head of “officers or firm members,” which is commonly assumed to apply to the official staff of a corporation. An examination of the schedules of 1890 gives reason for believing that in many instances these salaried officials were included among skilled workmen.

The second change, compared with 1890, resulted in reducing the number of salaried officials and total salaries in all classes of industries.

¹ Part I, pages ciii and civ.

² In the comparative tables published in the state reports in Part II, and in many of the special reports in Parts III and IV, reference is made to the following note against the number of salaried officials, clerks, etc., and salaries, in 1890: “Includes proprietors and firm members, with their salaries, number only reported in 1900.” It should be stated that in such cases the number of proprietors and firm members in 1900 is not included in the number of salaried officials, although this might perhaps be inferred from the wording of the note.

At the census of 1890 the number and salaries of proprietors and firm members actively engaged in business or in its supervision were reported, combined with clerks and other officials. In cases where proprietors and firm members were reported without salaries, the amount that would ordinarily be paid for such services was estimated. It is impossible to segregate the number of proprietors and firm members, with their compensation, from the number of salaried officials, managers, clerks, etc., with their salaries.

At the census of 1900 the number of proprietors and firm members actively engaged in the industry or in supervision was ascertained, and no salaries were reported for them, since it is an almost universal rule that their compensation is not a fixed sum, but is dependent upon the earnings of the enterprise.

No conclusions should be drawn from the general tables in which censuses prior to 1900 are compared, without bearing in mind the effect of the changes in 1900.

Persons employed—groups.—The evolution of statistics concerning persons employed has developed well-defined distinctions between three groups, as follows: (1) The operating group, composed of proprietors and firm members; (2) the salaried group, composed of salaried officials, superintendents, managers, clerks, etc.; and (3) the wage-earning group, composed of skilled and unskilled labor of both sexes. The members of the first group receive no fixed remuneration, and only the number of persons composing it was collected in 1900 and 1905. Table XVIII is a comparative table which shows the number of persons in each of the two remaining groups and the amount of money paid them in 1900 and 1905.

TABLE XVIII.—EMPLOYEES AND SALARIES AND WAGES: 1905 AND 1900.

	1905				1900				Per cent of increase.	
	Number.	Per cent of total.	Salaries and wages.	Per cent of total.	Number.	Per cent of total.	Salaries and wages.	Per cent of total.	Number.	Salaries and wages.
Total.....	5,990,072	100.0	\$3,186,301,763	100.0	5,079,225	100.0	\$2,390,624,890	100.0	17.9	33.3
Salaried officials, clerks, etc.....	519,751	8.7	\$74,761,231	18.0	364,202	7.2	\$80,889,091	15.9	42.7	50.9
Wage-earners.....	5,470,321	91.3	2,611,540,532	82.0	4,715,023	92.8	2,009,735,799	84.1	16.0	29.9

¹ Average number.

The table shows that the number of employees engaged in manufactures during the census year was 5,990,072, a gain of 17.9 per cent over the corresponding figures for 1900. Of the total number employed, as reported in 1905, 8.7 per cent were salaried officials, clerks, etc., and 91.3 per cent were wage-earners. The census of 1905 reported the immense sum of \$3,186,301,763 as expended in salaries and wages, an increase of 34.5 per cent over the returns for 1900. Of this total, 18 per cent went to salaried officials, clerks, etc.; and the balance to wage-earners.

The increase in the amount paid to the members of the salaried group was 50.9 per cent and in wages to the wage-earning group, 29.9 per cent, as against an increase in number of 42.7 per cent in the former group, and of 16 per cent in the latter. These percentages indicate increases in the average earnings of both classes.

Table XIX is a comparative summary showing the distribution of salaried employees and wage-earners, together with the salaries and wages paid them, by states and geographic divisions, for 1900 and 1905.

TABLE XIX.—SALARIED EMPLOYEES AND SALARIES, WAGE-EARNERS—MEN, WOMEN, AND CHILDREN—AND WAGES DISTRIBUTED ACCORDING TO GEOGRAPHIC DIVISIONS, STATES, AND TERRITORIES: 1905 AND 1900.

GEOGRAPHIC DIVISION, STATE OR TERRITORY.	Census.	WAGE-EARNERS AND WAGES.									
		SALARIED EMPLOYEES.		Total.		Men 16 years and over.		Women 16 years and over.		Children under 16 years.	
		Number.	Salaries.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.
United States.....	1905	519,751	\$74,761,231	5,470,321	\$2,611,540,532	4,244,538	\$2,266,273,317	1,067,884	\$317,270,008	150,809	\$27,988,207
	1900	364,202	380,889,091	4,715,023	2,009,735,799	3,635,230	1,730,347,184	918,511	248,814,074	161,276	24,674,541
New England states.....	1905	60,258	72,799,265	940,752	439,050,232	650,148	345,138,972	263,650	88,086,475	26,954	5,824,785
	1900	45,402	53,396,463	851,903	367,074,353	582,572	288,229,968	244,541	74,804,009	24,790	4,639,776
Maine.....	1905	3,772	3,988,797	74,958	32,691,759	56,062	27,315,682	16,825	5,106,692	1,471	269,385
	1900	3,103	3,050,676	69,914	25,730,735	50,382	20,981,559	17,357	4,445,865	2,175	303,311
New Hampshire.....	1905	2,646	2,972,107	65,366	27,693,203	44,483	20,865,433	19,916	6,640,451	907	187,319
	1900	2,068	2,199,676	67,646	25,849,631	45,413	19,321,185	20,594	6,199,947	1,639	238,499
Vermont.....	1905	2,053	2,102,708	33,106	15,221,059	28,321	13,818,380	4,569	1,362,144	216	40,529
	1900	1,695	1,610,514	28,179	11,426,548	23,954	10,341,995	3,973	1,042,145	252	42,408
Massachusetts.....	1905	32,824	38,654,624	488,399	232,388,946	326,586	178,513,343	147,044	50,521,465	14,769	3,354,138
	1900	25,256	29,479,742	438,234	195,278,276	292,019	150,524,860	133,890	42,344,591	12,325	2,408,816
Rhode Island.....	1905	5,420	7,040,678	97,318	43,112,637	61,346	31,797,035	30,742	10,245,356	5,290	1,070,240
	1900	4,022	5,300,576	88,197	35,995,101	55,305	26,611,661	27,967	8,483,533	4,985	890,907
Connecticut.....	1905	13,523	17,040,351	181,605	87,942,628	132,750	72,829,063	44,554	14,210,367	4,301	903,168
	1900	9,258	11,755,279	159,733	73,394,062	115,499	60,448,609	40,820	12,258,528	3,414	656,835

MANUFACTURES.

TABLE XIX.—SALARIED EMPLOYEES AND SALARIES, WAGE-EARNERS—MEN, WOMEN, AND CHILDREN—AND WAGES
DISTRIBUTED ACCORDING TO GEOGRAPHIC DIVISIONS, STATES, AND TERRITORIES: 1905 AND 1900—Cont'd.

GEOGRAPHIC DIVISION, STATE OR TERRITORY.	Census.	WAGE-EARNERS AND WAGES.									
		SALARIED EMPLOYEES.		Total.		Men 16 years and over.		Women 16 years and over.		Children under 16 years.	
		Number.	Salaries.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.
Middle states.....	1905	198,370	\$225,050,766	2,005,513	\$974,105,359	1,477,425	\$823,343,753	471,400	\$140,803,364	56,688	\$9,958,242
	1900	136,213	150,997,226	1,725,731	773,258,384	1,259,992	651,271,349	406,087	112,563,092	59,052	9,423,943
New York.....	1905	98,012	111,145,175	859,947	430,014,851	603,519	349,506,071	245,440	79,016,531	7,979	1,492,249
	1900	68,030	76,740,115	726,909	337,323,585	503,674	272,844,471	210,834	62,412,171	12,401	2,066,943
New Jersey.....	1905	23,196	28,956,728	266,336	128,168,801	195,447	108,470,226	62,887	18,183,140	8,002	1,515,435
	1900	15,361	19,057,698	213,975	95,104,913	156,787	80,216,939	49,356	13,636,089	7,832	1,311,835
Pennsylvania.....	1905	66,081	73,269,007	763,282	367,900,890	594,487	324,870,814	134,344	37,071,325	34,451	6,018,751
	1900	43,935	46,145,480	663,900	296,875,548	516,101	261,511,244	115,657	30,186,886	32,302	5,177,418
Delaware.....	1905	1,451	1,629,251	18,475	8,158,203	14,866	7,373,343	2,960	679,607	649	105,193
	1900	1,189	1,336,903	20,502	8,457,003	16,416	7,636,497	3,310	693,231	836	127,275
Maryland.....	1905	8,624	8,843,996	94,174	36,144,244	63,492	23,656,349	25,149	5,675,452	5,533	812,443
	1900	6,741	6,845,088	94,170	32,414,429	61,654	26,220,954	26,908	5,465,620	5,608	727,855
District of Columbia.....	1905	1,006	1,206,609	6,299	3,658,370	5,614	3,496,950	611	177,240	74	14,171
	1900	957	871,882	6,155	3,022,906	5,300	2,841,194	722	160,095	73	12,617
Southern states.....	1905	55,637	55,128,940	768,362	278,569,494	632,880	253,872,560	89,743	18,406,704	45,739	6,290,230
	1900	34,940	31,072,813	628,053	185,688,781	515,182	108,450,100	71,895	12,839,900	40,976	4,398,781
Virginia.....	1905	4,970	4,874,806	80,285	27,943,058	65,055	25,197,302	11,990	2,294,017	3,240	451,679
	1900	3,828	3,629,609	66,223	20,273,889	52,671	18,299,026	9,889	1,608,958	3,663	395,905
West Virginia.....	1905	2,802	2,898,830	43,758	21,153,042	39,378	20,148,006	3,240	772,458	1,131	231,978
	1900	1,744	1,519,290	33,080	12,639,856	29,458	11,975,783	2,812	538,780	810	125,284
North Carolina.....	1905	4,072	3,795,471	85,339	21,375,294	55,406	16,433,078	18,801	3,451,704	11,632	1,490,512
	1900	2,894	2,394,846	72,322	14,051,784	47,028	10,772,818	15,084	2,293,177	10,210	985,780
South Carolina.....	1905	2,389	2,355,002	59,441	13,808,950	37,653	10,233,237	12,019	2,313,512	9,769	1,322,201
	1900	1,419	1,307,509	47,025	9,130,269	29,097	6,663,088	9,448	1,024,035	8,480	843,146
Georgia.....	1905	6,104	5,927,521	92,749	27,392,442	72,814	23,969,802	12,640	2,512,161	7,295	910,479
	1900	3,815	3,203,043	83,336	19,958,153	67,039	17,428,895	10,071	1,849,632	6,226	679,626
Florida.....	1905	3,125	2,669,726	42,091	15,767,182	39,656	15,121,963	2,098	602,857	337	42,362
	1900	1,781	1,299,570	35,471	10,916,443	33,626	10,459,964	1,617	416,777	328	39,702
Kentucky.....	1905	5,853	5,871,247	59,794	24,438,684	49,508	22,170,710	8,323	1,975,270	1,963	292,695
	1900	4,356	4,184,631	51,735	18,454,252	43,500	16,951,525	6,083	1,234,264	2,162	268,463
Tennessee.....	1905	4,010	5,080,429	60,572	22,805,628	51,757	21,150,048	6,611	1,317,356	2,204	338,224
	1900	3,329	3,047,603	45,903	14,727,506	39,095	13,574,559	4,875	923,303	1,993	229,644
Alabama.....	1905	3,763	3,867,139	62,173	21,878,451	53,496	20,393,027	4,547	924,141	4,130	561,233
	1900	2,259	2,059,391	52,711	14,911,683	45,837	13,975,032	3,465	589,156	3,409	347,495
Mississippi.....	1905	2,638	2,598,346	38,690	14,819,034	35,364	14,167,965	2,054	464,599	1,272	186,470
	1900	1,260	1,092,937	26,799	7,909,607	24,336	7,546,324	1,448	243,720	1,015	119,563
Arkansas.....	1905	2,328	2,369,890	33,089	14,543,635	32,066	14,329,273	501	120,108	522	94,254
	1900	1,549	1,262,885	31,525	10,184,154	30,433	10,013,152	424	76,307	618	94,095
Louisiana.....	1905	5,977	6,044,404	55,859	25,315,750	49,042	24,141,298	4,604	966,872	1,313	207,580
	1900	3,576	2,933,935	40,878	14,725,437	34,763	13,570,252	5,009	1,020,037	1,106	135,148
Indian Territory.....	1905	278	251,378	2,257	1,144,078	2,149	1,119,040	69	18,532	39	6,506
	1900	93	74,072	1,087	379,188	1,054	372,875	19	4,632	14	1,681
Oklahoma.....	1905	535	467,042	3,199	1,655,324	2,870	1,565,594	258	76,948	71	12,782
	1900	176	144,590	1,294	514,879	1,200	498,395	58	11,908	36	4,575
Texas.....	1905	5,753	6,117,709	49,066	24,408,942	45,766	23,731,548	2,479	596,109	821	141,225
	1900	2,861	2,918,676	38,604	16,911,681	35,995	16,378,411	1,693	405,205	916	128,065
Central states.....	1905	174,211	185,975,465	1,476,812	741,127,958	1,234,315	674,264,787	215,757	61,826,884	26,740	5,036,287
	1900	127,608	125,091,748	1,290,003	568,803,004	1,084,064	518,589,176	174,120	42,927,898	31,819	5,286,020
Ohio.....	1905	39,991	43,434,868	364,298	182,429,425	303,828	166,270,529	55,375	15,222,146	5,095	936,750
	1900	28,109	28,151,441	308,109	136,427,579	268,778	124,960,436	45,272	10,802,733	4,059	664,360
Michigan.....	1905	17,235	17,470,433	175,229	81,278,837	147,676	74,374,061	24,270	6,293,446	3,283	611,330
	1900	13,350	12,335,974	155,800	62,531,812	134,265	57,895,929	19,014	4,258,303	2,621	377,560
Indiana.....	1905	14,862	15,028,789	154,174	72,058,099	131,551	66,725,926	10,230	4,684,651	3,393	647,522
	1900	10,447	9,970,931	139,017	59,280,131	119,580	55,304,859	15,917	3,387,973	3,520	587,299
Illinois.....	1905	54,521	60,559,678	379,436	208,405,468	314,091	187,568,896	60,309	19,893,360	4,946	943,212
	1900	40,964	40,549,245	332,871	159,104,170	275,006	143,714,217	47,922	13,580,271	9,943	1,809,691
Wisconsin.....	1905	14,220	15,498,232	151,391	71,471,805	129,274	66,167,356	17,970	4,574,028	4,147	730,421
	1900	10,480	10,492,562	137,525	55,695,816	118,332	51,845,213	13,640	2,973,092	5,553	877,511
Minnesota.....	1905	9,141	9,032,840	66,636	35,843,145	60,886	33,377,340	8,430	2,412,756	320	53,049
	1900	6,625	6,064,229	64,557	29,029,100	57,123	27,187,606	6,736	1,729,776	698	111,808
Iowa.....	1905	7,122	5,948,377	49,481	22,097,053	41,082	20,963,933	7,314	1,854,474	1,085	178,646
	1900	5,159	4,232,544	44,420	18,020,653	36,896	16,530,958	5,729	1,230,266	1,795	259,489
Missouri.....	1905	17,119	19,002,238	133,167	66,644,126	105,927	58,816,746	22,769	6,892,023	4,471	935,357
	1900	12,474	13,294,822	107,704	46,713,734	84,084	41,149,958	19,890	4,965,494	3,730	598,282

EMPLOYEES AND WAGES AND TIME IN OPERATION.

lxxiii

TABLE XIX.—SALARIED EMPLOYEES AND SALARIES, WAGE-EARNERS—MEN, WOMEN, AND CHILDREN—AND WAGES DISTRIBUTED ACCORDING TO GEOGRAPHIC DIVISIONS, STATES, AND TERRITORIES: 1905 AND 1900—Cont'd.

GEOGRAPHIC DIVISION, STATE OR TERRITORY.	Census.	SALARIED EMPLOYEES.		WAGE-EARNERS AND WAGES.							
				Total.		Men 16 years and over.		Women 16 years and over.		Children under 16 years.	
		Number.	Salaries.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.	Average number.	Wages.
Western states.....	1905	13,370	\$14,800,309	112,867	\$71,404,425	102,502	\$68,435,276	8,443	\$2,532,204	1,832	\$436,855
	1900	9,834	9,432,106	93,867	51,159,359	85,885	49,213,042	5,712	1,544,618	2,270	401,699
Montana.....	1905	905	1,506,208	8,957	8,652,217	8,755	8,570,406	143	59,993	59	21,758
	1900	508	785,737	9,854	7,376,822	9,662	7,318,409	86	20,567	106	28,846
Idaho.....	1905	359	379,311	3,061	2,059,391	2,931	2,019,172	90	31,129	40	9,090
	1900	92	66,225	1,552	818,239	1,498	807,748	32	8,453	22	2,038
Wyoming.....	1905	179	206,306	1,834	1,261,122	1,793	1,246,138	33	13,480	8	1,504
	1900	87	90,047	2,060	1,209,123	2,030	1,190,968	15	6,059	15	3,096
North Dakota.....	1905	296	257,812	1,755	1,031,307	1,521	963,058	199	62,339	35	5,910
	1900	152	129,532	1,358	671,321	1,232	630,858	92	29,862	34	4,601
South Dakota.....	1905	441	294,353	2,492	1,421,080	2,179	1,329,891	280	83,030	33	5,759
	1900	288	175,487	2,224	1,129,787	2,033	1,087,461	81	25,392	110	16,934
Nebraska.....	1905	3,102	3,074,911	20,260	11,022,149	17,321	10,142,694	2,542	788,545	397	90,910
	1900	2,296	2,107,251	18,669	8,842,429	16,227	8,269,206	1,709	435,880	733	137,343
Nevada.....	1905	106	126,156	802	693,407	790	688,672	8	3,867	4	808
	1900	37	34,600	504	352,606	481	348,176	6	2,143	17	2,287
Utah.....	1905	979	1,038,353	8,052	5,157,400	6,840	4,861,513	1,017	259,736	195	36,151
	1900	599	500,612	5,413	2,762,522	4,663	2,593,668	577	138,200	173	30,594
Colorado.....	1905	2,677	3,549,043	21,813	15,100,365	20,104	14,531,394	1,343	490,193	306	78,778
	1900	1,870	2,058,798	19,498	11,707,596	18,214	11,303,204	1,081	361,042	203	43,320
Kansas.....	1905	3,721	3,692,491	35,570	18,883,071	32,138	18,060,690	2,703	708,022	729	174,359
	1900	3,612	3,123,221	27,119	12,802,096	24,378	12,197,657	1,945	483,647	796	120,792
Arizona.....	1905	291	471,548	4,793	3,969,248	4,742	3,950,629	33	14,814	18	3,805
	1900	205	269,304	3,126	2,287,352	3,064	2,270,135	27	10,079	35	7,138
New Mexico.....	1905	224	263,814	3,478	2,153,068	3,388	2,130,959	52	14,146	38	7,963
	1900	88	90,692	2,490	1,199,496	2,403	1,180,552	61	14,234	26	4,710
Pacific states.....	1905	17,710	20,624,590	164,077	106,187,485	145,313	100,132,329	16,862	5,615,099	1,902	440,057
	1900	10,123	10,780,965	123,200	63,777,148	108,282	59,219,274	15,555	4,133,652	2,309	424,322
Washington.....	1905	3,658	4,092,919	45,199	30,087,287	43,782	29,605,475	1,304	455,789	113	26,023
	1900	2,103	2,063,448	31,523	17,065,140	30,641	16,827,447	631	186,863	251	50,840
Oregon.....	1905	1,769	2,132,514	18,523	11,443,512	16,843	10,950,459	1,474	450,150	206	42,903
	1900	1,143	1,222,160	14,459	6,822,011	13,067	6,491,943	1,116	233,072	276	46,996
California.....	1905	12,283	14,399,157	100,355	64,656,686	84,688	59,576,395	14,094	4,799,160	1,583	371,131
	1900	6,877	7,495,357	77,224	39,889,997	61,574	35,890,884	13,808	3,663,627	1,342	326,486
Outlying district:											
Alaska.....	1905	195	321,909	1,938	1,095,579	1,805	1,085,640	20	8,183	14	1,751
	1900	82	117,770	2,260	1,374,680	2,259	1,374,275	1	405		

In the employment of salaried employees and wage-earners the Middle states led at both periods shown and the Central states ranked second. The ascendancy of the Middle states was due to New York and Pennsylvania, while the importance of the Central states depended upon Illinois and Ohio. In 1905 and 1900, ranked by the number of salaried employees, New York, Pennsylvania, Illinois, and Ohio led the states in the order named, but ranked by the number of wage-earners employed the order was New York, Pennsylvania, Massachusetts, Illinois, and Ohio.

It is significant that while in 1900 there were nearly 13 wage-earners to every salaried employee in the United States, in 1905 the ratio declined to 10.5 to 1. This decrease in the ratio between wage-earners and salaried employees was not confined to any one section, but appeared in the statistics for each division. The greatest decline in the ratio occurred in the Southern states, where from about 18 wage-earners to

every salaried employee in 1900, in 1905 the ratio dropped to 13.8 to 1.

That these wide discrepancies between the increases in the number of salaried employees and the number of wage-earners were general is further illustrated by Table xx, which compares the percentages of increase of the two groups for each geographic division.

TABLE XX.—Per cent of increase for salaried employees and wage-earners, by geographic divisions: 1900 to 1905.

GEOGRAPHIC DIVISION.	Salaried employees (number).	Wage-earners (average number).
United States.....	42.7	16.0
New England states.....	32.7	10.4
Middle states.....	45.6	16.2
Southern states.....	59.2	22.3
Central states.....	36.5	14.5
Western states.....	36.0	20.2
Pacific states.....	74.9	33.2
Outlying district ¹	137.8	² 14.2

¹ Alaska.

² Decrease.

No specific cause for the apparently disproportionate increase in the number of salaried employees can be given, but two general propositions may be advanced in explanation, as follows: First, that improved methods in the Bureau of the Census led to greater care in the segregation of salaried employees in 1905 than in 1900, and second, that changes in business and manufacturing methods have imposed upon the manufacturer the necessity of making more numerous additions relatively to his salaried employees than to his wage-earning force.

Improvements in Office methods.—In 1905 the schedule distinguished clearly between the two groups, placing them under distinct headings with separate totals; whereas in 1900 the inquiries for salaried employees and wage-earners, although listed separately, were under one general heading, "persons employed," and their totals included in a common total. Thus the segregation was far more carefully made in 1905, with the result that the salaried group received numerous additions that in 1900 had either been entirely omitted or improperly classed as wage-earners.

Furthermore, the use of Census Office men for fieldwork in 1905 undoubtedly contributed to the same result. In 1900 few trained special agents were available for the work, and the field force was composed of men taken from various pursuits whose ability to follow the distinction adopted by the Census Office between the salaried and the wage-earning groups of employees was limited by lack of experience and deficient knowledge of the intent of the inquiry. In 1905, on the other hand, the fieldwork was conducted entirely by Office men who had been carefully trained to apply uniform rules in distinguishing between the two groups, with the result, as regards salaried employees, of a broader and more inclusive classification than in 1900.

The difference between the personnel of the field force at the two periods also led to the return of a more accurate average number of wage-earners in 1905 than in 1900. At the census of 1905 great stress was laid upon the careful calculation of the average number per month in answer to Inquiry 7, and the Office men understood clearly what was required for the inquiry, but at the census of 1900 the special agents could not be instructed as fully upon this point. It is probable, therefore, that the tendency to return a greater number than the true average, which has formerly almost always characterized the work of inexperienced agents, did not affect the accuracy of the results for 1905 to the same extent as for 1900. Thus the average in 1905 was proportionately smaller and the increase over 1900 not as great as it would have been if the average for 1900 had been nearer to the actual conditions. It follows that the difference between the increases in the number of wage-earners and of salaried employees was not as great in reality as Table XVIII indicates.

Administrative changes in manufacturing.—The administrative requirements of a well-conducted manufacturing establishment are more numerous than formerly. Increasing competition demands the most economical production, which can only be achieved by the closest scrutiny of the expenses incident to production. Thus more complicated bookkeeping, closer supervision in the shop, and a larger staff of trained scientific men have become necessary to effect the desired results. Moreover, many manufacturing corporations at the present day consider an advertising department and a mail order division as indispensable to the expansion of their business; whereas only a few years ago, with few exceptions, they disposed of their products through wholesale houses. Such changes must bring numerous additions to the salaried force.

Aside from the normal increases due to natural growth, a certain proportion of the increase in the salaried group is doubtless due to changes in form of ownership. As the chapter on the form of ownership indicates, there is a constantly increasing number of individual manufacturers and firms who incorporate. Every such case adds at least two and usually more members to the salaried group, and takes one or more out of the operating group. Thus the salaried group is receiving constant accessions without any alteration taking place in the wage-earning group. Under such conditions it is natural that the former group should show a greater rate of increase than the latter.

The effect of these changes in the methods of the Census Office and in the administration of manufacturing establishments stands out most clearly in the case of exceptionally large plants. Especially is this true in the manufacture of iron and steel, some illustrations of which will prove instructive.

In 6 of the largest steel mills in Pennsylvania the increases in the number of salaried employees ranged from 57.6 per cent to 186.7 per cent, and in every case exceeded the percentages of increase in the number of wage-earners for the same establishments, the difference in the respective percentages amounting to over 100 per cent in 2 establishments. Furthermore, the number of wage-earners to each salaried employee in these 6 mills varied far more widely in 1900 than in 1905. In 1900 the average number of wage-earners to a salaried employee for 3 of the mills was from 19 to 23.7, and for the remaining 3 from 9.7 to 12.5; whereas in 1905, 1 establishment reported less than 9, but none, more than 15 wage-earners to each salaried employee. The probable accuracy of the 1905 figures is evidenced in the case of 4 of the 6 establishments, which reported the remarkably consistent ratios of 9.6, 9.7, 10.3, and 12 wage-earners, respectively, to each salaried employee.

Wage-earners.—The wage-earning group is composed of the average number of persons employed in manufactures during the census year, receiving pay for work done by the hour, day, or week, and includes

pieceworkers employed in the factory or works, but excludes those working at their homes. Table XXI is a comparison for 1900 and 1905 of the average number of persons in this group and the total amount

paid to them, distributed according to the men 16 years and over, women 16 years and over, and children under 16 years of age.

TABLE XXI.—WAGE-EARNERS—MEN, WOMEN, AND CHILDREN—AND WAGES, WITH PERCENTAGES: 1905 AND 1900.

	1905				1900				Per cent of increase.	
	Average number.	Per cent of total.	Wages.	Per cent of total.	Average number.	Per cent of total.	Wages.	Per cent of total.	Average number.	Wages.
Total.....	5,470,321	100.0	\$2,611,540,532	100.0	4,715,023	100.0	\$2,009,735,799	100.0	16.0	29.9
Men 16 years and over.....	4,214,538	77.6	2,266,273,317	86.8	3,635,235	77.1	1,736,347,184	86.4	16.8	30.5
Women 16 years and over.....	1,065,881	19.5	317,279,008	12.1	918,511	19.5	248,814,074	12.4	16.0	27.5
Children under 16 years.....	159,899	2.9	27,988,207	1.1	161,276	3.4	24,574,541	1.2	10.9	13.9

¹ Decrease.

At the census of 1905 an average of 5,470,321 wage-earners was employed, of whom 77.6 per cent were men 16 years and over, 19.5 per cent women 16 years and over, and 2.9 per cent children under 16 years. The total amount paid to the members of this group was \$2,611,540,532, of which 86.8 per cent was earned by the men, 12.1 per cent by the women, and 1.1 per cent by the children. These proportions represent only slight changes from those of 1900. It is particularly noticeable that the ratio of the number of women employed to the total number of wage-earners remained constant, and that the proportion of the total amount paid to wage-earners which went to women wage-earners underwent a change of only three-tenths of 1 per cent during the five years.

With the exception of the number of children employed, the increases in the number of wage-earners were practically uniform, amounting to 16 per cent both in the total number of all wage-earners and in the number of women employed, and to 16.8 per cent for the number of men.

The decrease of 1,377, or nine-tenths of 1 per cent, in the number of children should not be regarded as necessarily reflecting actual conditions as to the employment of child labor in the United States. Much difficulty has always been experienced in obtaining accurate returns of children employed, owing to the disinclination of the individual employer to reveal the real extent of the employment of such labor in his factory, even though he be within the law in this particular. The returns are therefore not altogether reliable, and the figures in the table must not be accepted as conclusive evidence of a decrease in the employment of child labor.

The percentages of increase in wages were not as uniform for the different classes of wage-earners as in the case of the numerical increases, and in every case were greater than for the latter; thus it is evident that the average wage of the three classes of wage-earners employed in manufactures has increased. The increase in the total amount of wages paid to all classes amounted to 29.9 per cent, which was six-tenths of 1

per cent less than the increase in the amount earned by the men, and 2.4 per cent more than the increase in the amount paid to the women.

Wage-earners, by geographic divisions.—Table XXII presents the per cent distribution by geographic divisions of the total for each class for the United States for the censuses of 1900 and 1905.

TABLE XXII.—Wage-earners—men, women, and children—by geographic divisions; per cent distribution of total for United States: 1905 and 1900.

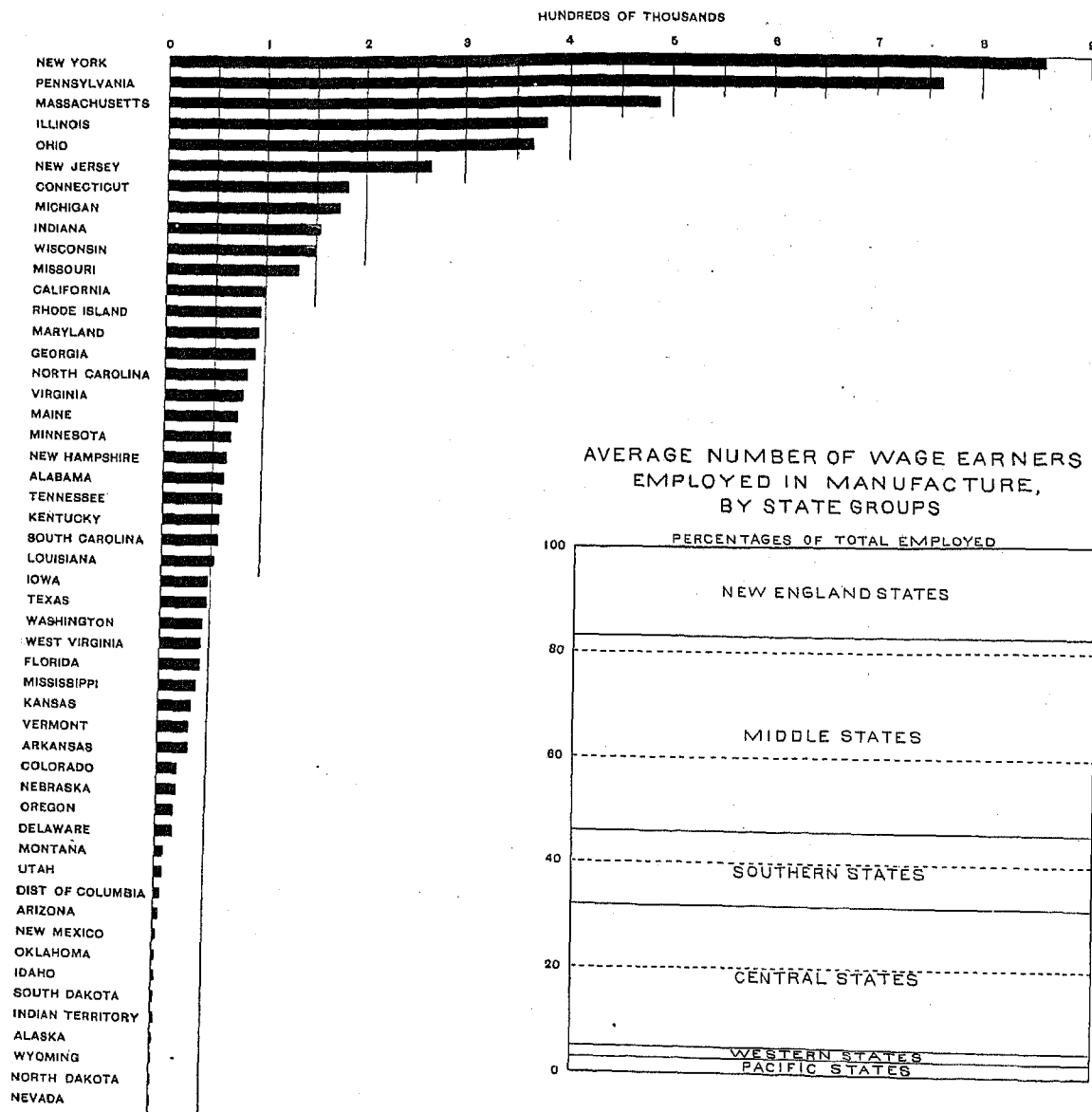
GEOGRAPHIC DIVISION.	Census.	PER CENT DISTRIBUTION OF TOTAL FOR UNITED STATES.			
		Total.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.
United States.....	1905	100.0	100.0	100.0	100.0
	1900	100.0	100.0	100.0	100.0
New England states.....	1905	17.2	15.3	24.7	16.9
	1900	18.1	16.0	26.6	15.4
Middle states.....	1905	36.7	34.8	44.2	35.4
	1900	36.6	34.6	44.3	36.0
Southern states.....	1905	14.0	14.9	8.4	28.6
	1900	13.3	14.2	7.8	25.4
Central states.....	1905	27.0	29.1	20.3	16.7
	1900	27.4	29.8	19.0	19.7
Western states.....	1905	2.1	2.4	0.8	1.2
	1900	2.0	2.4	0.6	1.4
Pacific states.....	1905	3.0	3.4	1.6	1.2
	1900	2.6	2.9	1.7	1.5
Outlying district ¹	1905	(²)	0.1	(²)	(²)
	1900	(²)	0.1	(²)	(²)

¹ Alaska.

² Less than one-tenth of 1 per cent.

Measured by the number of wage-earners employed in manufactures, the Middle states formed industrially the most important geographic division in the United States at the censuses of 1900 and 1905, contributing at the two periods 36.6 and 36.7 per cent, respectively, of the total number of wage-earners employed. The Central states ranked next, but, according to Table XIX, in 1905 gave employment to 528,701 fewer wage-earners than the leading division, although outranking by nearly the same number—the New England states. The three leading divisions furnished employment to 80.9 per cent of the total number of wage-earners.

DIAGRAM 1.—AVERAGE NUMBER OF WAGE-EARNERS EMPLOYED, BY STATES AND TERRITORIES: 1905.



In 1905 the New England states contributed 24.7 per cent of the total number of women employed in manufactures, which was 19.5 per cent less than the proportion contributed by the Middle states, but greater by 4.4 per cent than the proportion returned by the Central states. In the employment of children, the Middle states led in both 1900 and 1905, with the Southern states second. The figures indicate that these two divisions employed 64 per cent of all the children under 16 years who were employed in the United States during the census year 1904.

Table XXIII presents the per cent formed by each class of wage-earners of the total number of wage-earners in each geographic division.

Disregarding the outlying division as of slight importance, the percentage of men in the total number of wage-earners employed shown by the Western states was the largest for any of the geographic divisions, the men employed in that division forming in 1905, 90.9 per cent of the total number of wage-earners for the division. The New England states ranked last in this particular, the men employed forming only 69.1 per cent of the wage-earners in the division. In the latter division, however, the ratio of the women employed to the total number of wage-earners was higher than in any of the other divisions, while the ratio of children employed was second only to that in the Southern states. Out of the six important divisions, New England alone

failed to show a decrease in the ratio of children to the total number of wage-earners employed, the per cent remaining constant at 2.9.

TABLE XXIII.—*Wage-earners—men, women, and children—by geographic divisions; per cent distribution of total number of wage-earners for each division: 1905 and 1900.*

GEOGRAPHIC DIVISION.	Census.	PER CENT DISTRIBUTION OF TOTAL NUMBER OF WAGE-EARNERS FOR EACH DIVISION.			
		Total.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.
United States.....	1905	100.0	77.6	19.5	2.9
	1900	100.0	77.1	19.5	3.4
New England states.....	1905	100.0	69.1	28.0	2.9
	1900	100.0	68.4	28.7	2.9
Middle states.....	1905	100.0	73.7	23.5	2.8
	1900	100.0	73.0	23.6	3.4
Southern states.....	1905	100.0	82.4	11.7	5.9
	1900	100.0	82.0	11.5	6.5
Central states.....	1905	100.0	83.6	14.6	1.8
	1900	100.0	84.0	13.5	2.5
Western states.....	1905	100.0	90.9	7.5	1.6
	1900	100.0	91.5	6.1	2.4
Pacific states.....	1905	100.0	88.6	10.3	1.1
	1900	100.0	85.5	12.6	1.9
Outlying district ¹	1905	100.0	97.8	1.5	0.7
	1900	100.0	99.9	0.1	.....

¹ Alaska.

Table xxiv presents the numerical increases and percentages of increase, 1900 to 1905, for wage-earners—men, women, and children—by geographic divisions, exclusive of the outlying district, Alaska.

TABLE XXIV.—*Wage-earners—men, women, and children—numerical increases and percentages of increase, by geographic divisions: 1900 to 1905.*

GEOGRAPHIC DIVISION.	NUMERICAL INCREASES.			PER CENT OF INCREASE.		
	Men 16 years and over.	Women 16 years and over.	Children under 16 years.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.
New England states....	67,576	19,109	2,164	11.6	7.8	8.7
Middle states.....	217,433	64,713	12,364	17.3	15.9	14.0
Southern states.....	117,698	17,848	4,763	22.8	24.8	11.6
Central states.....	150,251	41,637	15,079	13.9	23.9	16.0
Western states.....	16,677	2,731	1,408	19.4	47.8	18.0
Pacific states.....	40,031	1,307	1,467	38.0	8.4	19.7

¹ Decrease.

This table shows that there were absolute increases in the number of men and women for each division, but that in four out of the six divisions there were decreases in the number of children. The greatest absolute increase shown both for men and for women

appeared in the Middle states; the smallest increase for the men was in the Western states and for the women in the Pacific states. The greatest decrease in the number of children employed took place in the Central states; the net decrease for all six divisions was 1,391 children. The greatest relative increase in the number of men was in the Pacific states, although only the Western states showed a smaller absolute increase. The only division showing a marked increase in the number of children employed was the Southern states, which employed 4,763 more children in 1905 than in 1900, an increase of 11.6 per cent.

Wage-earners, by industries and groups of industries.—

One of the best means which a census of manufactures affords for determining the importance of an individual industry or a group of industries is found in the statistics for wage-earners. Table xxv shows the number of men, women, and children employed in each of the 14 generic groups of industries, compared for 1900 and 1905, together with the per cent that each class formed of the total for the class in the United States.

During the year covered by the census of 1905, 21.1 per cent of the total number of wage-earners employed were engaged in the manufacture of textiles and textile products, a decrease, however, of six-tenths of 1 per cent since 1900. The iron and steel group ranked second in 1905 with 15.7 per cent and the lumber group third with 13.5 per cent of the total number employed. The three leaders were far ahead in this respect, their aggregates in 1900 and 1905 representing 51.6 and 50.3 per cent, respectively, of the total number of wage-earners employed in the United States.

In the employment of men the groups "iron and steel and their products" and "lumber and its remanufactures" stood in a class by themselves, their aggregates forming 36.3 per cent of the total number of men in 1905. The aggregate number of men employed in the four succeeding groups, ranked by the number of men employed, did not equal the total of the two leading groups.

The industries composing the textile group were the greatest employers of women and children, furnishing employment in 1905 to 54.7 per cent of the women and 51 per cent of the children. Of the four leading groups, ranked by the total number of wage-earners, in 1905, "lumber and its remanufactures" employed the fewest women and the "miscellaneous" group the fewest children.

TABLE XXV.—COMPARATIVE SUMMARY—AVERAGE NUMBER OF WAGE-EARNERS IN THE FOURTEEN GROUPS OF INDUSTRIES: 1905 AND 1900.

GROUP.	Census.	WAGE-EARNERS.				PER CENT OF TOTALS FOR THE UNITED STATES.			
		Total average number.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.	Total average number.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.
United States.....	1905	5,470,321	4,244,538	1,065,884	159,899	100.0	100.0	100.0	100.0
	1900	4,715,023	3,635,236	918,511	161,276	100.0	100.0	100.0	100.0
Food and kindred products.....	1905	351,054	264,682	79,801	9,568	6.5	6.2	7.5	6.0
	1900	301,305	227,282	63,091	10,932	6.4	6.3	6.9	6.8
Textiles.....	1905	1,156,305	492,161	582,630	81,514	21.1	11.6	54.7	51.0
	1900	1,022,123	423,573	521,284	77,266	21.7	11.6	56.8	47.9
Iron and steel and their products.....	1905	857,208	830,274	18,510	8,514	15.7	19.6	1.7	5.3
	1900	737,086	716,186	13,779	8,021	15.6	19.7	1.5	4.9
Lumber and its remanufactures.....	1905	735,945	708,357	16,673	10,915	13.5	16.7	1.6	6.8
	1900	672,655	647,508	13,229	11,918	14.3	17.8	1.4	7.4
Leather and its finished products.....	1905	255,368	182,126	65,843	7,390	4.7	4.3	6.2	4.6
	1900	241,602	169,886	65,310	6,466	5.1	4.7	7.1	4.0
Paper and printing.....	1905	350,205	250,375	90,580	9,250	6.4	5.9	8.5	5.8
	1900	297,320	211,378	73,886	12,056	6.3	5.8	8.0	7.5
Liquors and beverages.....	1905	68,340	66,309	1,191	840	1.3	1.6	0.1	0.5
	1900	55,120	53,210	952	958	1.2	1.5	0.1	0.6
Chemicals and allied products.....	1905	210,165	187,881	20,491	1,793	3.8	4.4	1.9	1.1
	1900	182,227	162,517	17,817	1,893	3.9	4.5	1.9	1.2
Clay, glass, and stone products.....	1905	285,365	205,049	10,854	9,462	5.2	6.2	1.0	5.9
	1900	231,753	211,832	9,307	10,614	4.9	5.8	1.0	6.6
Metals and metal products, other than iron and steel.....	1905	211,706	176,478	31,348	3,880	3.9	4.1	2.9	2.4
	1900	171,903	141,347	26,137	4,479	3.6	3.9	2.9	2.8
Tobacco.....	1905	159,408	85,691	66,301	7,416	2.9	2.0	6.2	4.7
	1900	132,526	70,218	49,330	6,978	2.8	2.1	5.4	4.3
Vehicles for land transportation.....	1905	384,577	381,283	2,196	1,098	7.0	9.0	0.2	0.7
	1900	314,340	310,810	2,237	1,293	6.7	8.5	0.2	0.8
Shipbuilding.....	1905	50,754	49,915	65	771	0.9	1.2	(1)	0.5
	1900	46,747	45,711	31	1,002	1.0	1.3	(1)	0.6
Miscellaneous industries.....	1905	390,831	303,957	79,398	7,476	7.1	7.2	7.5	4.7
	1900	307,296	237,778	62,118	7,400	6.5	6.5	6.8	4.6

1 Less than one-tenth of 1 per cent.

Table XXVI shows the 25 industries which averaged the greatest number of wage-earners in 1905, and compares the totals, distributed according to the three classes of wage-earners, with those for 1900.

TABLE XXVI.—Comparative summary—wage-earners (men, women, and children) for twenty-five leading industries ranked by the total average number employed: 1905 and 1900.

INDUSTRY.	Census.	AVERAGE NUMBER OF WAGE-EARNERS.			
		Total.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.
United States.....	1905	5,470,321	4,244,538	1,065,884	159,899
	1900	4,715,023	3,635,236	918,511	161,276
Total for 25 industries.....	1905	3,384,184	2,626,896	645,817	111,471
	1900	2,951,855	2,202,591	547,921	111,343
Per cent of increase.....		14.6	14.6	17.9	0.1
Lumber and timber products.....	1905	404,626	401,209	911	2,506
	1900	413,335	408,058	1,728	3,549
Per cent of increase.....		12.1	11.7	147.3	129.4
Foundry and machine shop products.....	1905	402,914	397,222	3,266	2,426
	1900	350,103	344,541	2,626	2,636
Per cent of increase.....		15.1	15.2	24.4	18.0
Cotton manufactures.....	1905	315,874	147,283	128,163	40,428
	1900	302,801	135,721	126,882	40,258
Per cent of increase.....		4.3	8.5	1.0	0.4
Iron and steel, including blast furnaces and steel works and rolling mills.....	1905	242,640	230,283	1,455	1,902
	1900	222,490	210,618	1,071	1,901
Per cent of increase.....		9.1	9.0	35.9	0.1

1 Decrease.

TABLE XXVI.—Comparative summary—wage-earners (men, women, and children) for twenty-five leading industries ranked by the total average number employed: 1905 and 1900—Continued.

INDUSTRY.	Census.	AVERAGE NUMBER OF WAGE-EARNERS.			
		Total.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.
Cars and general shop construction and repairs by steam railroad companies.....	1905	236,900	236,304	494	102
	1900	173,452	173,209	364	79
Per cent of increase.....		36.4	36.4	35.7	29.1
Boots and shoes.....	1905	149,924	95,257	49,535	5,132
	1900	141,830	90,415	46,894	4,521
Per cent of increase.....		5.7	5.4	5.6	13.5
Clothing, men's.....	1905	137,190	58,759	75,468	2,963
	1900	120,927	48,070	60,846	3,011
Per cent of increase.....		13.4	22.2	8.0	11.6
Tobacco, cigars and cigarettes.....	1905	135,418	72,970	57,174	5,274
	1900	103,365	62,094	37,740	3,531
Per cent of increase.....		31.0	17.5	51.5	49.4
Clothing, women's.....	1905	115,705	42,614	72,242	849
	1900	83,739	26,109	59,866	764
Per cent of increase.....		38.2	63.2	27.0	11.1
Furniture.....	1905	110,133	104,206	3,165	2,762
	1900	87,262	82,013	2,476	2,773
Per cent of increase.....		26.2	27.1	27.8	10.4
Hosiery and knit goods.....	1905	103,715	25,167	68,867	9,681
	1900	83,387	21,154	53,565	8,668
Per cent of increase.....		24.4	19.0	28.6	11.7
Lumber, planing mill products, including sash, doors, and blinds.....	1905	97,674	95,967	432	1,275
	1900	73,510	71,886	238	1,356
Per cent of increase.....		32.9	33.5	81.5	18.0

1 Decrease.

TABLE XXVI.—Comparative summary—wage-earners (men, women, and children) for twenty-five leading industries ranked by the total average number employed: 1905 and 1900—Continued.

INDUSTRY.	Census.	AVERAGE NUMBER OF WAGE-EARNERS.			
		Total.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.
Printing and publishing, newspapers and periodicals.	1905	90,868	76,817	17,528	2,523
	1900	94,004	73,653	14,815	6,136
Per cent of increase.		2.4	4.3	18.3	158.9
Printing and publishing, book and job.	1905	87,746	65,293	19,975	2,478
	1900	67,610	51,743	13,769	2,098
Per cent of increase.		29.8	26.2	45.1	18.1
Bread and other bakery products.	1905	81,234	64,580	14,844	1,800
	1900	60,192	47,801	10,441	1,890
Per cent of increase.		35.0	34.0	42.2	11.6
Silk and silk goods.	1905	79,601	27,037	45,198	7,366
	1900	65,416	24,206	34,797	6,413
Per cent of increase.		21.7	11.7	29.9	14.9
Woolen goods.	1905	72,747	44,452	24,552	3,743
	1900	68,893	40,601	24,635	3,757
Per cent of increase.		5.6	9.5	0.1	10.4
Slaughtering and meat packing, wholesale.	1905	69,583	64,171	4,459	953
	1900	64,681	60,095	2,935	1,651
Per cent of increase.		7.6	6.8	51.9	141.7
Worsted goods.	1905	69,251	29,883	32,130	7,238
	1900	57,008	25,595	26,829	5,584
Per cent of increase.		21.5	16.8	24.4	29.6
Brick and tile.	1905	66,021	64,612	36	1,373
	1900	61,979	59,956	76	1,947
Per cent of increase.		6.5	7.8	152.6	129.5
Paper and wood pulp.	1905	65,964	56,827	8,882	255
	1900	49,646	41,547	7,030	169
Per cent of increase.		32.9	36.8	12.0	50.9
Glass.	1905	63,969	54,079	3,455	6,435
	1900	52,818	42,173	3,529	7,116
Per cent of increase.		21.1	28.2	12.1	19.6
Carriages and wagons.	1905	60,722	59,411	870	441
	1900	58,425	57,209	840	376
Per cent of increase.		3.9	3.8	3.6	17.3
Electrical machinery, apparatus, and supplies.	1905	60,466	48,976	10,902	588
	1900	42,013	34,462	6,956	595
Per cent of increase.		43.9	42.1	56.7	11.2
Leather, tanned, curried, and finished.	1905	57,230	54,517	1,814	908
	1900	52,109	50,402	1,173	534
Per cent of increase.		9.8	8.2	54.6	70.0

¹ Decrease.

The importance of the 25 leading industries to the wage-earning classes engaged in manufactures is indicated by the table. Of the total number of wage-earners employed in the United States in 1905, they provided work for 61.9 per cent. Of the total number in each class, they gave employment to 61.9 per cent of the men, 60.6 per cent of the women, and 69.7 per cent of the children. In both 1900 and 1905 the industry "lumber and timber products" averaged the greatest number of wage-earners, although the figures for 1905 indicate a decrease of 8,709 wage-earners. This industry alone of the 25 in the table showed a loss in the total number of wage-earners. This decrease was not actual, but resulted from the inflation of the figures for 1900, caused by duplications in the returns for wage-earners employed in logging that were avoided in 1905 by a slight change on the schedule in the form of the inquiry.¹

¹ See special report on "Lumber and Timber Products."

"Foundry and machine shop products" was next in importance, employing in 1905 only 1,712 fewer wage-earners than the leading industry. The third industry, "cotton goods," while ranking only fifth in the number of men employed, supplied work for a larger number both of women and children than any other industry.

The greatest absolute increase took place in the industry "cars and general shop construction, etc.," and amounted to 63,248 wage-earners. The greatest relative increase, 43.9 per cent, is shown for the manufacture of electrical machinery, apparatus, and supplies.

Wage-earners employed each month.—In Table xxvii is presented the average number of wage-earners employed each month by classes—men, women, and children—and the greatest and least number employed at any one time during the year.

TABLE XXVII.—Average number of wage-earners each month, and the greatest and least number employed at any one time: 1905.

MONTH.	Total.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.
January.	5,262,567	4,074,441	1,034,765	153,361
February.	5,330,577	4,123,314	1,052,624	154,639
March.	5,450,903	4,223,835	1,070,563	156,505
April.	5,496,144	4,276,617	1,061,301	158,136
May.	5,516,150	4,310,410	1,047,486	158,259
June.	5,467,764	4,272,643	1,034,866	160,255
July.	5,327,932	4,155,955	1,015,934	156,043
August.	5,424,579	4,208,512	1,054,153	161,914
September.	5,611,489	4,325,420	1,116,905	169,164
October.	5,677,732	4,381,251	1,129,222	167,259
November.	5,587,406	4,327,079	1,085,068	162,259
December.	5,490,543	4,254,979	1,074,631	160,933
Greatest number.	7,017,138			
Least number.	4,599,091			

The table shows that the smallest average number of wage-earners was employed in January and the greatest in October. From February to May, inclusive, each month showed an increase over its predecessor, but the average for June failed to reach the average of either May or April, and the average for July dropped below that of any month of the year except January. The fall seasonal industries, however, brought the averages for September, October, and November considerably above the other months. The year closed in December with an absolute increase over January of 227,976 wage-earners, or 4.3 per cent.

The greatest number employed during the year was 7,017,138, while the least number was 4,599,091. The greatest and least numbers are the aggregates, respectively, of the greatest and least numbers reported by all establishments, irrespective of the date of employment in the individual establishment. Therefore neither the greatest nor the least number represents the maximum or minimum number employed at any one time during the census year; they are composite numbers, the components of which lack unity of time.

The variations for each month from the average for the year are shown graphically in Table xxviii, which presents the relative monthly averages, computed on the basis of the average number of wage-earners employed during the year.

TABLE XXVIII.—*Relative wage-earners per month compared with the average for the year: 1905.*

[Average for the year = 100.0.]

MONTH.	Total.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.
January.....	96.2	96.0	97.1	95.9
February.....	97.5	97.1	98.8	96.7
March.....	99.6	99.5	100.4	97.9
April.....	100.5	100.8	99.6	98.9
May.....	100.8	101.6	98.3	99.0
June.....	100.0	100.7	97.1	100.2
July.....	97.4	97.9	95.3	97.6
August.....	99.2	99.2	98.9	101.3
September.....	102.6	101.9	104.8	105.8
October.....	103.8	103.2	105.9	104.6
November.....	102.1	101.9	103.0	101.5
December.....	100.4	100.2	100.8	100.6

The table shows that in January, as compared with the average for the census year, there were 3.8 per cent fewer wage-earners employed and in October 3.8 per cent more. The greatest variation was shown in the figures for the employment of children, which from an average in January 4.1 per cent lower went to an average number in September 5.8 per cent higher than the average for the year. The highest percentages above the average for the year were shown in September, October, and November, indicating the effect of seasonal industries dependent for materials upon the harvesting period of the year. It is evident that the seasonal industries responsible for the increased percentages in the three months mentioned employ more women and children, relatively, than men, since the departure from the average for the year is in general far more marked in the case of the two former classes than in the latter. It is noticeable that for all classes the averages for the closing month of the year varied only by fractions of 1 per cent from the average for the whole year.

An example of one of the seasonal industries largely responsible for the variations during the fall of the year, as indicated by Table xxviii, is presented in Table xxix.

TABLE XXIX.—*Fruits and vegetables, canning and preserving; average number of wage-earners, by months: 1905.*

MONTH.	Total.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.
January.....	5,168	3,067	1,888	213
February.....	4,739	2,926	1,604	209
March.....	5,650	3,563	1,846	241
April.....	7,465	4,484	2,614	367
May.....	13,203	6,797	5,855	551
June.....	28,869	12,685	14,410	1,774
July.....	47,823	20,686	23,412	3,725
August.....	103,035	39,715	54,119	9,201
September.....	132,828	53,096	69,119	10,613
October.....	87,141	34,355	47,386	5,400
November.....	30,326	13,148	16,327	851
December.....	13,609	6,598	6,676	335

The table shows that from an average of 5,168 wage-earners employed in January the number

engaged in canning and preserving fruits and vegetables increased to an average of 132,828 for September. The absolute increase, therefore, was 127,660, or 36.6 per cent of the absolute increase in the average number for the United States for the same period. The increase in one seasonal industry, then, accounted for over one-third of the variation between the average numbers for January and September for the United States. The increases in the totals do not, however, show to what an extent this industry is responsible for the large increases in the number of women and children shown in Table xxvii for the fall months. The absolute increase for September over January in the average number of women in the industry was 67,231, and in the number of children, 10,400, these increases constituting 81.8 and 65.8 per cent of the absolute increases in these classes of wage-earners during the same period for all industries in the United States.

Wage-earners, women and children.—Figures for the leading industries in which the employment of women and children was an important factor are presented in Table xxx, which compares the total number of wage-earners, distributed according to classes, returned for each industry at every census from 1870 to 1905. The industries selected are conducted under the factory system, so that a comparison of the censuses of 1900 and 1905 with previous censuses is not affected by the exclusion of neighborhood industries and hand trades from the figures for the former two years.

Of the industries shown in the table there were, in 1905, 5 in which women and children comprised over 50 per cent of the total number of wage-earners and 4 in which they formed between 30 and 50 per cent. In 3 of the textile industries—cotton manufactures, hosiery and knit goods, and silk manufactures—the women and children outnumbered the men, but in the manufactures of wool they were not quite so numerous.

Changes from census to census in the ratios between the number in each class and the total number of wage-earners are numerous in each industry. During the periods for which they appear in the table, 6 of the 12 industries showed increasing proportions of men employed, as follows: Cotton manufactures, from 31.6 to 46.6 per cent; wool manufactures, from 50.8 to 52.7 per cent; silk manufactures, from 26.1 to 34 per cent; glass, from 72.2 to 84.5 per cent; boxes, fancy and paper, from 26 to 29.8 per cent; rubber and elastic goods, from 59.6 to 65.4 per cent. For the quarter of a century ending with 1905 the greatest decrease in the proportion of men employed was in the manufacture of boots and shoes, the ratio declining from 74.3 to 63.5 per cent.

EMPLOYEES AND WAGES AND TIME IN OPERATION.

lxxx

TABLE XXX.—COMPARATIVE SUMMARY—WAGE-EARNERS—MEN, WOMEN, AND CHILDREN—IN TWELVE SELECTED INDUSTRIES, WITH PER CENT EACH CLASS IS OF THE TOTAL NUMBER: 1870 TO 1905.

INDUSTRY.	Census.	AVERAGE NUMBER OF WAGE-EARNERS.				PER CENT EACH CLASS IS OF TOTAL.		
		Total.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.	Men 16 years and over.	Women 16 years and over.	Children under 16 years.
Total.....	1905	1,378,890	748,017	533,134	97,739	54.2	38.7	7.1
	1900	1,207,879	656,637	454,403	96,839	54.4	37.6	8.0
	1890	962,377	532,022	364,012	66,343	55.3	37.8	6.9
	1880	682,521	358,466	241,469	52,586	52.5	35.4	12.1
	1870	349,799	163,191	133,401	53,147	46.6	38.2	15.2
Cotton manufactures.....	1905	315,874	147,283	128,163	40,428	46.6	40.6	12.8
	1900	302,861	135,721	126,882	40,258	44.8	41.9	13.3
	1890	218,876	88,837	106,607	23,432	40.6	48.7	10.7
	1880	185,472	64,107	91,148	30,217	34.6	49.1	16.3
	1870	135,369	42,790	69,637	22,942	31.6	51.4	17.0
Printing and publishing.....	1905	185,191	142,565	37,614	5,012	77.0	20.3	2.7
	1900	162,992	125,964	28,765	8,263	77.3	17.6	5.1
	1890	136,836	110,434	19,026	7,376	80.7	13.9	5.4
	1880	58,506	45,890	6,777	5,839	78.4	11.6	10.0
	1870	20,075	16,721	1,560	1,785	83.3	7.8	8.9
Wool manufactures.....	1905	179,976	94,841	72,222	12,913	52.7	40.1	7.2
	1900	159,108	83,371	64,141	11,596	52.4	40.3	7.3
	1890	154,271	78,550	64,944	10,777	50.9	42.1	7.0
	1880	132,672	67,942	49,107	15,623	51.2	37.0	11.8
	1870	105,071	53,400	39,150	12,521	50.8	37.3	11.9
Tobacco.....	1905	159,408	85,691	66,301	7,416	53.8	41.6	4.6
	1900	132,526	76,218	49,330	6,978	57.5	37.2	5.3
	1890	116,790	74,394	34,778	7,618	63.7	29.8	6.5
	1880	86,053	54,085	19,884	11,184	63.9	23.1	13.0
	1870	47,848	31,907	7,794	8,057	66.9	16.3	16.8
Boots and shoes.....	1905	140,924	95,257	40,535	5,132	63.5	33.1	3.4
	1900	141,830	90,415	46,804	4,521	63.7	33.1	3.2
	1890	133,090	91,406	39,849	2,435	68.4	29.8	1.8
	1880	111,152	82,547	25,122	3,483	74.3	22.6	3.1
	1870	(1)	(1)	(1)	(1)			
Hosiery and knit goods.....	1905	103,715	25,167	68,867	9,681	24.3	66.4	9.3
	1900	83,387	21,154	53,565	8,668	25.4	64.2	10.4
	1890	59,588	14,846	40,826	3,916	24.9	68.5	6.6
	1880	28,885	7,517	17,707	3,661	26.0	61.3	12.7
	1870	14,788	4,252	7,991	2,545	28.8	54.0	17.2
Silk manufactures.....	1905	79,601	27,037	45,198	7,366	34.0	56.8	9.2
	1900	65,416	24,206	34,797	6,413	37.0	53.2	9.8
	1890	49,382	17,602	28,914	2,866	35.6	58.6	5.8
	1880	31,337	9,375	16,396	5,566	29.9	52.3	17.8
	1870	6,649	1,734	3,529	1,386	26.1	53.1	20.8
Glass.....	1905	63,969	54,079	3,455	6,435	84.5	5.4	10.1
	1900	52,818	42,173	3,529	7,116	79.8	6.7	13.5
	1890	44,892	36,064	1,885	6,943	80.3	4.2	15.5
	1880	24,177	17,778	741	5,658	73.5	3.1	23.4
	1870	15,367	11,092	703	3,572	72.2	4.6	23.2
Electrical machinery, apparatus, and supplies.....	1905	60,466	48,976	10,902	588	81.0	18.0	1.0
	1900	42,013	34,462	6,956	595	82.0	16.6	1.4
	1890	8,802	7,289	1,469	44	82.8	16.7	0.5
	1880	1,271	1,132	72	67	89.0	5.7	5.3
	1870	(2)	(2)	(2)	(2)			
Boxes, fancy and paper.....	1905	32,082	9,575	20,527	1,980	29.8	64.0	6.2
	1900	27,653	7,739	18,192	1,722	28.0	65.8	6.2
	1890	18,949	5,567	12,866	516	29.4	67.9	2.7
	1880	9,678	2,194	6,886	448	22.7	70.6	6.7
	1870	4,632	1,205	3,088	339	26.0	66.7	7.3
Millinery and lace goods.....	1905	27,500	3,683	23,400	417	13.4	85.1	1.5
	1900	16,871	2,654	14,035	182	15.7	83.2	1.1
	1890	11,118	2,524	8,552	42	22.7	76.9	0.4
	1880	6,555	971	5,248	336	14.8	80.1	5.1
	1870	(1)	(1)	(1)	(1)			
Rubber and elastic goods.....	1905	21,184	13,863	6,950	371	65.4	32.8	1.8
	1900	20,404	12,560	7,317	527	61.5	35.9	2.6
	1890	9,183	4,509	4,296	378	49.1	46.8	4.1
	1880	6,763	4,028	2,431	304	59.6	35.9	4.5
	1870	(2)	(2)	(2)	(2)			

¹ Returns not comparable.

² Not reported separately in 1870.

Increases in the proportion of women employed to the total number of wage-earners are shown in 9 industries, as follows: Printing and publishing, from 7.8 to 20.3 per cent; wool manufactures, from 37.3 to 40.1 per cent; tobacco, from 16.3 to 41.6 per cent; boots and shoes, from 22.6 to 33.1 per cent; hosiery and knit goods, from 54 to 66.4 per cent; silk manufactures, from 53.1 to 56.8 per cent; glass, from 4.6 to 5.4 per cent; electrical machinery, apparatus, and supplies,

from 5.7 to 18 per cent; millinery and lace goods, from 80.1 to 85.1 per cent. The greatest proportional decrease in the number of women took place in cotton manufactures and amounted to 10.8 per cent.

The ratio of children employed to the total number of wage-earners decreased in each industry from 1870 to 1905, with one exception—the manufacture of boots and shoes. Of the total number of wage-earners employed in this industry in 1880, 3.1 per cent were chil-

dren, while in 1905 the ratio had increased to 3.4 per cent, a gain of three-tenths of 1 per cent. The greatest decrease in the ratio of children to total number of wage-earners employed took place in the glass industry and amounted to 13.1 per cent in the thirty-five years. Other notable decreases in this particular are shown for tobacco manufactures and silk manufactures,

amounting to 12.2 and 11.6 per cent, respectively. The industry of cotton manufactures is of particular interest because of the large number of women and children employed. Table xxxi shows the total number of wage-earners employed in the industry from 1870 to 1905, distributed according to geographic divisions and classes of wage-earners.

TABLE XXXI.—WAGE-EARNERS EMPLOYED IN COTTON MANUFACTURES: 1870 TO 1905.

GEOGRAPHIC DIVISION.	AVERAGE NUMBER OF WAGE-EARNERS.														
	Total.					Men 16 years and over.					Women 16 years and over.				
	1905	1900	1890	1880	1870	1905	1900	1890	1880	1870	1905	1900	1890	1880	1870
United States.....	315,871	302,891	218,876	174,659	135,369	147,283	135,721	88,837	61,760	42,790	128,163	126,882	106,607	84,558	69,637
New England states.....	159,477	164,944	147,359	127,185	94,775	77,552	79,014	63,749	46,897	30,203	72,373	74,882	73,445	62,568	50,805
Middle states.....	33,634	37,050	31,841	28,307	28,974	14,306	15,012	11,580	9,161	8,466	16,339	17,584	16,240	13,188	14,126
Southern states.....	120,193	97,559	36,415	16,741	10,173	54,664	40,555	12,517	5,050	3,640	37,938	32,545	15,083	7,587	4,190
Western states ¹	2,570	3,308	3,261	2,366	1,447	761	1,140	991	646	481	1,513	1,871	1,839	1,215	516

GEOGRAPHIC DIVISION.	AVERAGE NUMBER OF WAGE-EARNERS—continued.					PER CENT DISTRIBUTION, BY CLASSES, OF WAGE-EARNERS IN EACH DIVISION.														
	Children under 16 years.					Men.					Women.					Children.				
	1905	1900	1890	1880	1870	1905	1900	1890	1880	1870	1905	1900	1890	1880	1870	1905	1900	1890	1880	1870
United States.....	40,428	40,258	23,432	28,341	22,942	46.6	44.8	40.6	35.4	31.6	40.6	41.9	48.7	48.4	51.4	12.8	13.3	10.7	16.2	17.0
New England states.....	9,552	11,048	10,165	17,720	13,767	48.6	47.9	43.3	36.9	31.9	45.4	45.4	49.8	49.2	53.6	6.0	6.7	6.9	13.0	14.5
Middle states.....	2,989	4,454	4,021	6,018	6,382	42.5	40.5	36.4	32.3	29.2	48.6	47.5	51.0	46.5	48.8	8.9	12.0	12.6	21.2	22.0
Southern states.....	27,591	24,459	8,815	4,098	2,343	45.5	41.6	31.4	30.2	35.8	31.6	33.3	41.4	45.3	41.2	22.9	25.1	24.2	24.5	23.0
Western states ¹	296	297	431	505	450	20.6	34.5	30.4	27.3	33.2	58.9	56.5	56.4	51.4	35.7	11.5	9.0	13.2	21.3	31.1

¹ Includes Pacific states.

From the standpoint of the number of wage-earners employed in this industry, the New England states have stood first throughout the years considered by the table, with the second place filled by the Middle states at the censuses of 1870 and 1880, and by the Southern states at each succeeding census.

The most notable feature of the table is the progress made by the Southern states in the industry, as indicated by the number of wage-earners employed. Between 1880 and 1890 this number doubled and between 1890 and 1905 more than trebled. At the census of 1905 the Southern states gave employment to 38.1 per cent of all the wage-earners in the industry, while fifteen years previous the proportion amounted to but 16.6 per cent. From 1900 to 1905 the same division showed an increase of 23.2 per cent in the number of wage-earners employed, while the New England states showed a decrease of 3.3 per cent, and the Middle states, of 9.2 per cent. In this connection, however, it should be said that one of the largest cotton manufacturing centers in Massachusetts was involved in a long and obstinate strike in this industry during the year covered by the census of 1905. It is probable, therefore, that the decrease in New England was due to this cause rather than to an actual decline in the industry in that division.

The ratio of the number of men employed to the total number of wage-earners has been constantly in-

creasing since 1870. The increase in this ratio, amounting to 15 per cent, was made largely at the expense of the women wage-earners, whose ratio has decreased 10.8 per cent during the thirty-five years.

In the New England and Southern states the decrease in the proportion of women employed has been a feature in the industry, the decrease from 1870 to 1905 amounting to 9.6 per cent in the latter division and to 8.2 per cent in the former. The Middle states have varied but little, and the Western states have increased the proportion of women from 35.7 per cent in 1870 to 58.9 per cent in 1905. In the New England and Southern states the decrease in the proportion of women was offset by an increase in the proportion of men, indicating that men are displacing women in the industry.

The ratio of the number of children to the total number of wage-earners employed has decreased steadily in the New England and Middle states. In the Southern states the ratio increased from 23 per cent in 1870 to 25.1 per cent in 1900, when apparently the maximum was reached, as five years later, according to the census of 1905, only 22.9 per cent of the wage-earners employed in the industry in the South were children. In fact, in 1905 the children employed by the industry in this division comprised 68.2 per cent of the total number of children engaged in the manufacture of cotton goods in the United States.

DEVELOPMENT OF WAGE STATISTICS SINCE 1810.¹

Table xxxii shows the questions asked concerning persons employed and their compensation at the cen-

¹ This part of the chapter down to "Special committee's inquiry" was prepared by William A. Countryman, of the division of manufactures.

suses of 1820 and 1840, and all subsequent censuses up to 1890. The first account of manufactures, made in 1810, was very general, wages and wage-earners not being considered. No census of manufactures was taken in 1830, and the questions used at the censuses of 1900 and 1905 are presented and discussed in the preceding section of this chapter.

TABLE XXXII.—PERSONS EMPLOYED, SALARIES AND WAGES: QUESTIONS USED ON THE GENERAL SCHEDULE AT CENSUSES OF 1820, 1840, AND ALL SUBSEQUENT CENSUSES UP TO 1890.

[The x following the question and placed under the year, signifies that the question was asked that year.]

	1820	1840	1850	1860	1870	1880	1890
Amount paid annually in wages.....	x						
Average day's wages for an ordinary laborer.....						x	
Average day's wages for a skilled mechanic.....						x	
Average monthly cost of female labor.....			x	x			
Average monthly cost of male labor.....			x	x			
Average number of hands employed: Male; female.....			x	x			
Average number of hands employed: Males above 16 years; females above 15 years; children and youth.....					x	x	
Clerks or salesmen: Males above 16 years; females above 15 years; children; average number employed during the year; total amount paid in wages during the year.....							x
Greatest number of hands employed at any one time during the year.....						x	
Number of men employed.....		x					
Number of persons employed: Men; women; boys and girls.....	x						
Officers and firm members: Males; females; average number employed during the year; total amount paid in wages during the year.....							x
Operatives, engineers, and other skilled workmen, overseers and foremen, or superintendents (not general superintendents or managers): Males above 16 years; females above 15 years; children; average number employed during the year; total amount paid in wages during the year.....							x
Piecework (not included in the foregoing statement): Males above 16 years; females above 15 years; children.....							x
Total amount paid in wages during the year.....					x	x	
Watchmen, laborers, teamsters, and other unskilled workmen: Males above 16 years; females above 15 years; children; average number employed during the year; total amount paid in wages during the year.....							x
Weekly rates of wages paid and average number of hands employed at each rate (not including those employed on piecework) [from under \$5 by gradations to \$25 and over]: Males above 16 years; females above 15 years; children.....							x

¹ The "foregoing statement" included operatives, engineers, and other skilled workmen, overseers and foremen, or superintendents (not general superintendents or managers); watchmen, laborers, teamsters, and other unskilled workmen.

At the census of 1840, while the question in the great majority of instances was as stated in the table, the schedules for wool, cotton, flax, mixed manufactures, tobacco, and fur hats, caps, bonnets, etc., asked for the "number of persons employed," and the silk schedule, for the "number of males employed," and the "number of females and children employed." These may be regarded as special forms for the inquiry.

Although the reports of manufactures for 1850 and 1860 contained statistics of the annual cost of labor, there was no inquiry on the schedule as to the total amount of wages paid. It is probable that the returns in answer to the request for the average monthly cost of labor were used as the basis of an estimate. The instructions contained this clause: * * * "the average number of hands and the average monthly wages are to be returned, so that by dividing the latter by the former the result will show the average earnings of individuals."

In 1850 the instructions provided that "in all cases where the employer boards the hands, the usual charge of board is to be added to the wages," and in 1890 that "wages paid should include board or rent furnished as part compensation." No mention of this is found on the schedule for 1860 or 1870 but it was specifically required on the schedules for 1900 and 1905.

In 1880 some of the special schedules had a large variety of detailed wage inquiries, some covering daily or weekly rates, actual or average, and occupa-

tions, the results of which were utilized in the special reports. The special schedule for cotton manufactures also contained the following questions, among others, with a specific statement that answers, though desired, were not required by law: "What relation do the wages of 1880 bear to those of any previous date, both in actual amount and in purchasing power?" ("The answer may be in some respects a matter of judgment."—Note in schedule.) "What were the average earnings of women per week in the following periods?"—1840, 1850, 1860, 1870, 1875, and 1880—"in weaving only" and "in all departments including weaving?" "Are the females in the mills now older or younger, on the average, than at previous dates?" "What were the average earnings per week of male operatives, including overseers and second hands?" Many questions were asked bearing on productivity, and at the close this statement was made: "It may, perhaps, be possible for only a few of those to whom this is sent to answer all the questions, but partial answers will be very welcome." There was an evident attempt to cover the whole field and make the work thorough. Accompanying this census a special inquiry was made concerning rates of wages and average earnings by occupations in certain establishments and industries, and the results were presented in a separate volume. Some of the statistics extended over a period of thirty years.

The "total" on the schedule for 1890 for average

number employed and for the amount paid in wages during the year was the aggregate for the different classes, made as a matter of course from the class totals already furnished, and is not included in the table. At this census some of the schedules for selected industries contained many questions concerning average number and total wages, by occupations, sex, and age. The special schedule for "timber products" and for "lumber mills and sawmills" had, among other questions, these, asked for the different specified occupations: "Average number of hands employed during the year—white; colored; Indians; Chinese." "Total amount paid in wages during the year."

A special inquiry into hourly and weekly "actual rates of wages" in 1890 and 1900 for a limited number of establishments was undertaken in 1900, following the census itself, and published in a separate volume entitled "Employees and Wages." In this report cumulative percentages and the median and quartiles were used instead of the average.

In its inquiries into mines and quarries, for the calendar year 1902, and street and electric railways, and central electric light and power stations, covering the fiscal year ending June 30, 1902, the Bureau of the Census secured the average number of wage-earners by occupations and daily rates of pay, using cumulative percentages and, in some cases, the median; and in telephones and telegraphs, also for 1902, the average number by occupations. The average number of wage-earners embraced in these four inquiries aggregated about 800,000.

SPECIAL REPORTS ON WAGES.

The various special methods already alluded to, employed by the Bureau of the Census in treating wage-earners and wages, together with certain methods used in other special governmental inquiries, are described below and set forth by illustrative tables from the different reports.

Tenth Census.—The special report on wage statistics for the Tenth Census was prepared under the direction of Mr. Joseph D. Weeks, expert special agent. This report was limited to showing the rates of wages of the most important classes of employees in 627 establishments, distributed among 53 of the more important manufacturing, mechanical, and mining industries. In addition, some further data were collected bearing on the intervals of payment, hours of labor, regularity of employment, prices of products, cost of labor to a unit of product, and the percentages of wages to cost of products. Besides the information noted above the schedules on which the rates of wages were reported provided for giving the rates for a series of years. In some instances rates were secured for periods of thirty years. The tables that follow illustrate the method of presenting the data collected at this special investigation.

Table XXXIII presents part of the return of a boot and shoe factory in Indiana for rates of wages paid to the employees according to occupation, with the unit of payment, whether the month or day, from 1870 to 1880. The original table goes back to 1859.

TABLE XXXIII.—RATES OF WAGES PAID IN A BOOT AND SHOE FACTORY IN INDIANA: 1870 TO 1880.¹

CLASS OF EMPLOYEES.	Unit of payment.	1880	1879	1878	1877	1876	1875	1874	1873	1872	1871	1870
Overseer.....	Month.....	\$125.00	\$125.00	\$125.00	\$125.00	\$116.66	\$108.33	\$100.00	\$100.00	\$133.33	\$150.00	\$150.00
Cutter, upper.....	Day.....	3.10	3.00	2.75	3.00	3.00	3.00	3.00	3.50	3.50	3.50	3.50
Cutter, sole.....	Day.....	2.10	2.00	2.00	2.00	2.00	2.00	2.00	2.50	2.50	2.50	2.75
Fitter.....	Day.....	1.90	1.75	1.75	1.75	1.75	1.75	1.75	2.00	2.00	2.25	2.25
Laster.....	Day.....	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	2.00	2.00
Tree.....	Day.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.25	2.25
Bottomer.....	Day.....	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	2.00	2.00	2.00
Trimmer.....	Day.....	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	2.00	2.00	2.00
Burnisher.....	Day.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.15	2.15	2.15
Edge setter.....	Day.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Finisher.....	Day.....	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.75	2.75	3.00	3.00
McKay sewer and cabler.....	Day.....	2.25	2.00	2.00	2.25	2.25	2.25	2.25	2.25	2.50	2.50	2.50
Channel opener and cementer.....	Day.....	2.00	2.00	1.90	1.90	2.00	2.00	2.00	2.00	2.00	2.25	2.25
Beater out.....	Day.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Rand and wedge tacker.....	Day.....	1.25	1.25	1.25	1.25	1.25	1.25	1.50	1.50	1.50	1.50	1.50
Heel nailer.....	Day.....	1.75	1.75	1.75	1.75	2.00	1.90	1.90	1.90	2.00	2.00	2.00
Heel shaver.....	Day.....	1.50	1.50	1.75	1.75	1.75	1.75	1.75	1.75	1.75	2.00	2.00
Heel buckler.....	Day.....	1.75	1.75	1.75	1.50	1.50	1.75	1.75	2.00	2.00	2.00	2.00
Edge blacker.....	Day.....	1.75	1.75	1.75	1.75	1.75	1.75	1.75	2.00	2.00	2.00	2.00
Buffer on machine.....	Day.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.25	2.25	2.25	2.25
Shank buffer and marker.....	Day.....	1.75	1.75	1.75	1.75	1.75	1.75	1.75	2.00	2.00	2.00	2.00
Seat wheeler.....	Day.....	2.00	2.00	2.00	2.00	2.00	1.75	1.75	2.00	2.00	2.00	2.25
Sack liner and tye up.....	Day.....	2.00	2.00	2.00	1.75	1.75	2.00	2.00	2.00	2.00	2.25	2.25
Cleaner.....	Day.....	1.00	1.00	1.25	1.25	1.25	1.25	1.25	1.25	1.50	1.50	1.50
Buttoner or lacer.....	Day.....	1.00	1.00	1.00	1.00	1.00	1.00	1.25	1.25	1.25	1.25	1.25
Packer.....	Day.....	1.50	1.50	1.50	1.50	1.50	1.75	1.75	2.00	2.00	2.00	1.75

¹ Tenth Census, Vol. XX, page 16, "Statistics of Wages."

To show the care with which the returns were interpreted, the following "remarks" appended to the table are reproduced:

Remarks.—This establishment makes men's, boys', and youths' kip, calf, and grain boots, and women's, children's, and misses' goat, calf, and split (Polish) boots, shoes, and fine shoes.

For six months in the year about two hours per day overtime is made. This would increase the wages given in the above table about one-fifth. No extra time, however, was made during 1878.

Each workman finds his own kit of tools, but the expense would decrease his wages but slightly.

Payments are made on the 1st and 15th of each month in cash.

The hours of labor have been ten hours for all classes.

The establishment has been in constant operation twelve months in the year since 1860, with few and unimportant stoppages.

It is stated in the return furnished by this establishment that there have been three strikes, the cause of each being the introduction of new machinery. In each case the workmen resumed work on the employers' terms.

* * * * *

The quality of goods made has greatly improved, and consequently the efficiency of the workmen must be greater than formerly.

Many kinds of machinery have been introduced. This has had a tendency to lessen cost and to decrease the number of employees to a given amount of work.

Table xxxiv illustrates another phase of the special report on wages—the presentation of the ratio of cost of labor to total cost of production, with the average price of the products at the factory.

The return is from a shoe factory in Massachusetts and is for a series of years. It presents the average price of the shoes—first, second, and third quality—at the works, together with cost of labor to unit of product and percentage of wages to cost of production for each of the three qualities:

TABLE XXXIV.—Prices and cost of shoes per pair in Massachusetts: 1855 to 1880.

YEAR.	AVERAGE PRICE AT WORKS.			COST OF LABOR TO UNIT OF PRODUCT.			PER CENT OF WAGES TO COST.		
	First quality.	Second quality.	Third quality.	First quality.	Second quality.	Third quality.	First quality.	Second quality.	Third quality.
1855.....	\$1.00	\$0.80	\$0.65	\$0.30	\$0.25	\$0.22	34	32	33
1860.....	.95	.75	.60	.26	.20	.18	28	28	30
1865.....	1.75	1.60	1.25	.35	.32	.32	23	22	25
1870.....	1.40	1.20	.95	.40	.37	.34	28	30	36
1875.....	1.30	1.00	.70	.24	.23	.23	18	23	32
1880.....	1.10	.85	.....	.22	.22	.....	18	24	.....

A few mechanical occupations which are common to many industries were grouped by industries for purposes of ready reference. Table xxxv gives the wages of engineers in the agricultural implement industry.¹

¹ Tenth Census, Vol. XX, page 14, "Statistics of Wages," etc.

TABLE XXXV.—WAGES OF ENGINEERS—AGRICULTURAL IMPLEMENTS: 1867 TO 1880.¹

STATE.	City.	Unit of payment.	1880	1879	1878	1877	1876	1875	1874	1873	1872	1871	1870	1869	1868	1867
Illinois.....	Alton.....	Day.....	\$3.00	\$3.00	\$3.00	\$3.00	\$3.00	\$3.00	\$3.00	\$3.50	\$3.50	\$3.50	.....	.....	.....	.....
Illinois.....	Chicago.....	Day.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	.....	.....	.....	.....
Indiana.....	Evansville.....	Day.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	.....	.....	.....	.....
Kentucky.....	.....	Day.....	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.00	\$2.00	\$2.00	\$2.00	\$2.00
Massachusetts.....	Worcester.....	Day.....	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	.....	.....	.....
Michigan.....	Albion.....	Day.....	1.91	1.91	1.91	1.91	1.91	1.91	1.91	.....	.....	.....	.....	.....	.....	.....
Ohio.....	.....	Day.....	2.25	2.25	2.25	2.25	2.25	2.00	2.00	2.00	2.00	2.00	2.00	.....	.....	.....
Ohio.....	.....	Day.....	2.50	2.35	2.35	2.10	2.10	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Ohio.....	Dayton.....	Day.....	2.50	2.50	2.25	2.25	2.00	2.00	.....	.....	.....	.....	.....	.....	.....	.....

¹ Tenth Census, Vol. XX, page 503, "Statistics of Wages, etc."

Eleventh Census.—The inquiry which is now particularly identified as marking a distinct step at the Eleventh Census toward the ideal in wage statistics was that which required the "weekly rates of wages paid and average number of hands employed at each rate (not including those employed on piecework)" for males above 16 years, females above 15 years, and children. The classification began at "under \$5" and, passing through gradations of \$1, \$2, \$3, and \$5, reached finally "\$25 and over."

The classified weekly rates were not returned either in sufficient number or satisfactorily enough to be utilized for the entire United States, but answers to the other questions were used in a variety of ways bearing

upon the distribution of wages. The rates were shown only for 50 selected industries in 165 cities, being made part of a detailed table which presented also the average number of employees in each class called for by the schedule, average weekly earnings, total wages, and number of hours in an ordinary day of labor. These rates, as stated in the report, included those for officers, firm members, and clerks.¹ In this way the rates for 976,516 employees in 44,224 establishments were shown.

In illustration, part of a table follows, showing the males above 16 years of age in cotton mills at the classified weekly rates of wages:

¹ Eleventh Census, Vol. V, Manufacturing Industries, Part II, page xxviii, "Statistics of Cities."

TABLE XXXVI.—COTTON GOODS, CLASSIFIED UNDER RATES OF WAGES IN CITIES: 1890.¹

CITY.	WEEKLY RATES OF WAGES PAID AND AVERAGE NUMBER OF EMPLOYEES AT EACH RATE, INCLUDING OFFICERS, FIRM MEMBERS, AND CLERKS, BUT NOT THOSE EMPLOYED ON PIECEWORK.											
	Males above 16 years.											
	Total number.	Under \$5.	\$5 and over but under \$6.	\$6 and over but under \$7.	\$7 and over but under \$8.	\$8 and over but under \$9.	\$9 and over but under \$10.	\$10 and over but under \$12.	\$12 and over but under \$15.	\$15 and over but under \$20.	\$20 and over but under \$25.	\$25 and over.
Total.....	44,371	6,045	4,085	7,500	5,376	4,729	4,928	5,167	3,312	1,780	688	752
Atlanta, Ga.....	400	215	79	22	24	.....	11	3	12	27	1	6
Augusta, Ga.....	1,034	300	193	288	58	10	22	15	6	18	10	24
Boston, Mass.....	118	4	.....	2	3	1	83	2	13	7	1	2
Brooklyn, N. Y.....	70	1	.....	1	4	2	14	17	13	12	3	3
Chester, Pa.....	963	31	39	337	164	42	118	73	88	41	19	11
Cincinnati, Ohio.....	251	22	6	16	24	40	20	58	9	30	9	16
Fall River, Mass.....	9,163	1,243	899	1,498	1,016	1,244	1,164	1,207	510	185	86	81
Fitchburg, Mass.....	576	67	25	41	100	23	176	28	88	21	2	5
Holyoke, Mass.....	940	83	60	172	119	52	164	126	70	53	31	10
Lancaster, Pa.....	364	101	22	52	76	23	22	19	20	14	9	6
Lawrence, Ga.....	1,771	189	119	314	331	261	166	213	143	34	10	12
Lewiston, Me.....	1,900	287	210	328	238	178	214	235	111	80	30	21
Lincoln, R. I.....	1,705	96	105	342	266	294	172	207	118	38	16	31
Lowell, Mass.....	5,037	602	396	1,226	756	528	605	438	217	85	46	138
Manchester, N. H.....	4,019	270	268	747	656	454	556	540	289	118	66	55
Newark, N. J.....	591	14	13	117	17	12	28	82	90	191	13	14
New Bedford, Mass.....	3,140	375	316	453	368	411	218	593	271	51	41	43
New York, N. Y.....	111	1	.....	3	.....	4	.....	4	53	30	13	3
Paterson, N. J.....	287	75	12	20	28	17	22	28	61	16	4	1
Pawtucket, R. I.....	1,170	67	132	200	113	186	140	146	73	69	24	20
Petersburg, Va.....	179	69	15	21	20	8	10	13	11	2	10	.....
Philadelphia, Pa.....	2,802	176	221	154	241	238	285	470	446	382	93	96
Providence, R. I.....	1,016	55	88	236	119	154	90	96	78	73	12	15
Springfield, Mass.....	9	.....	.....	1	1	.....	2	1	2	1	1	.....
Taunton, Mass.....	895	167	88	135	95	125	72	64	112	14	9	14
Utica, N. Y.....	593	116	61	76	108	23	43	105	24	20	5	12
Woonsocket, R. I.....	1,149	345	104	149	102	148	93	99	37	30	33	9
Worcester, Mass.....	56	1	1	1	.....	1	4	15	13	4	1	15
All other cities.....	4,062	983	612	548	359	250	414	270	304	164	72	86

¹ Eleventh Census, Vol. V, Manufacturing Industries, Part II, page 718, "Statistics of Cities."

Index numbers—Report of Senate Committee on Finance.—In the report made March 3, 1893, by the Senate Committee on Finance, on wholesale prices, wages, and transportation,¹ relative numbers were first made use of to show the rise or fall in wages during a period of years. The first step in the computation of relative numbers is the adoption of a base line or the period to represent 100 in the system to be adopted. In the report under consideration wages in January, 1860, were taken as the basis, and the subsequent wages in every occupation in each industry expressed in percentages of the standard. Thus, if the rate of wages in an occupation was \$50 a month for January, 1860, and \$100 for the same period ten years later, then, representing the basic number by 100, the relative wage ten years later was 200, or an increase of 100 per cent. In order to obtain the relative wages for all industries, two methods were pursued. The first method consisted in obtaining a simple average of the relative wages for all the occupations comprising each industry. This gave the relative wage for the industry; then a simple average of the relative wages for all industries was adopted as the relative wage for all industries. By this method industries in which the number of persons employed was small and the rate

of wages great were given the same weight as industries in which a large number of wage-earners were employed at small wages. To obviate this defect and give each industry its proper importance, the second method was resorted to, which consisted in weighting—as it is technically called—the industries according to the number of persons employed. This was done by multiplying the relative wage in each industry by the number of persons whose wages were reported in that industry and dividing the sum of the results by the total number of persons reported for all industries.

In the Senate report daily wages from 1840 to 1891 were obtained from actual pay rolls in 22 industries, but only 21 were shown in the final tables. The number of distinct series of quotations, or wage returns, from 1860 to 1891 was 543. Very many of these covered the same occupation in different establishments of the same industry. The daily wages paid January, 1860, were taken as the base or standard of each wage series presented and an index number calculated for each year backward to 1840 and forward to 1891. For instance, in January, 1860, one band boy in a given cotton mill (establishment 40) earned 75 cents per day, and another in the same mill, 83 cents. The average was, therefore, 79 cents and is the base or standard for that occupation. In January, 1861, in the same mill one band boy earned 60 cents, another 67 cents, and

¹ Wholesale Prices, Wages, and Transportation. Senate Report 1394, by Mr. Aldrich, from the Committee on Finance, March 3, 1893.

EMPLOYEES AND WAGES AND TIME IN OPERATION.

lxxxvii

two others 83 cents.¹ The average wage as shown for January, 1861, was accordingly 73½ cents, a decrease of 5½ cents, or 7 per cent. As 79 is taken as the base,

¹ Wholesale Prices, Wages, and Transportation, Senate Report 1394, by Mr. Aldrich, from the Committee on Finance, Part III, page 710.

or 100 per cent, a decrease of 7 per cent from that base (100 - 7 = 93) gives the relative wage or index number in 1861 for that wage return.

An illustration of the results of this method is given in Table XXXVII, which is a portion of a table for wage series in the report for cotton mills.

TABLE XXXVII.—COTTON GOODS, RELATIVE WAGES: 1860 TO 1870.¹

[The figures preceding the name of the occupation represent the number of the establishment for which the relative wages are given.]

YEAR.	23. Back boys.	40. Back bands.	38. Balers.	40 Band boys.	38. Beam carriers.	38. Beltmen.	38. Black- smiths.	38. Bobbin men.	38. Boiler men.	38. Boiler men's helpers.	38. Card grinders.
1860.....	100.0	.....	100.0	100.0	100.0	100.0	100.0	.....	100.0	100.0	100.0
1861.....	86.8	.....	83.0	83.0	83.2	100.0	97.5	100.0	85.7	100.0	90.2
1862.....	73.6	.....	83.0	126.6	83.2	111.3	105.6	100.0	95.4	100.0	110.7
1863.....	135.8	.....	108.0	.....	129.3	111.3	105.6	123.7	100.0	115.7	110.7
1864.....	177.4	100.0	133.0	.....	149.7	116.7	116.5	159.0	97.7	115.7	119.5
1865.....	171.7	125.0	133.0	63.3	102.3	122.0	150.6	153.4	107.1	129.6	140.0
1866.....	186.8	137.5	167.0	126.6	174.9	150.0	158.4	144.2	114.3	138.9	141.0
1867.....	207.5	131.8	167.0	94.3	167.1	150.0	158.4	146.6	114.3	138.9	154.6
1868.....	203.8	125.0	154.0	105.1	157.5	150.0	161.2	144.2	128.6	138.9	172.7
1869.....	201.9	145.0	163.0	94.9	157.5	150.0	161.2	176.7	114.3	146.3	182.0
1870.....	203.8	.....	150.0	100.0	159.0	183.2	167.3	167.8	104.6	146.3	177.6

¹ Wholesale Prices, Wages, and Transportation. Senate Report 1394, by Mr. Aldrich, from the Committee on Finance, Part I, page 122.

The index numbers for every series in each industry were then brought together by years in a general summary, as shown by the following section of a table:

TABLE XXXVIII.—RELATIVE WAGES, BY INDUSTRIES: 1860 TO 1870.¹

YEAR.	Leather.	Lumber.	Metals and metallie goods.	Paper.	Rail- roads.	Side- walks.	Spice.	Stone.	White lead.	Woolen goods.	All in- dustries.
1860.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1861.....	110.6	103.6	102.2	100.0	103.3	100.0	100.4	90.7	101.4	103.1	100.8
1862.....	123.4	107.2	102.8	89.5	101.4	100.0	114.0	91.5	104.8	103.6	102.9
1863.....	138.4	131.8	106.5	107.2	103.0	112.6	98.5	109.5	109.9	111.7	110.5
1864.....	153.7	144.6	121.3	108.9	111.7	137.5	106.6	135.7	120.6	120.7	125.6
1865.....	160.4	153.2	144.9	143.6	133.0	175.0	134.9	146.8	130.3	137.3	143.1
1866.....	158.1	154.2	148.0	153.9	142.1	187.5	145.9	152.5	131.9	146.1	152.4
1867.....	151.7	157.1	151.2	161.3	150.7	.....	125.5	159.3	135.2	150.5	157.6
1868.....	150.7	163.7	153.6	171.4	154.2	.....	120.3	163.8	134.0	144.0	159.2
1869.....	152.1	165.6	156.3	171.9	157.2	212.5	118.6	169.8	154.5	149.1	162.0
1870.....	151.6	169.0	157.1	171.1	164.8	212.5	143.9	168.8	119.0	154.5	162.2

¹ Wholesale Prices, Wages, and Transportation. Senate Report 1394, by Mr. Aldrich, from the Committee on Finance, Part I, page 174.

These are simple averages, but it was deemed advisable to give each industry a rank of importance according either to the numbers shown for it in the occupational tables of the various Federal censuses (except for 1840, when they were taken from the statistics of manufactures) or to an average based upon them. For the first five years of a decade the census figures for the decennial year were taken; for the last five a mean between the two censuses was used. As the figures for the 1890 census were still in process of tabulation when the report was being prepared, the figures for 1880 were used for 1880 to 1891. In making use of these weights the relative wage in each industry is multiplied by the appropriate weight and the sum of the results divided by the sum of the weights. The simple and the weighted averages are shown by the following illustrative table:

TABLE XXXIX.—Relative wages in all occupations, grouped by different methods: 1860 to 1870.¹

YEAR.	Simple average.	Average according to im- portance.
1860.....	100.0	100.0
1861.....	100.8	100.7
1862.....	102.9	103.7
1863.....	110.5	118.8
1864.....	125.6	134.0
1865.....	143.1	148.6
1866.....	152.4	155.6
1867.....	157.6	164.0
1868.....	159.2	164.9
1869.....	162.0	167.4
1870.....	162.2	167.1

¹ Wholesale Prices, Wages, and Transportation. Senate Report 1394, by Mr. Aldrich, from the Committee on Finance, Part I, page 176.

Department of Labor.—The main part of the Senate wage inquiry was conducted by the Department (now Bureau) of Labor, which had previously presented

wage statistics according to a variety of methods, although without employing index numbers. In 1900-1901 that Department began an extensive investigation into the wages per hour, earnings per week, and hours of labor, and the cost of living, beginning with 1890, in some of the leading occupations of a limited number of industries. This was much like a continuation of the Aldrich inquiry. Delays in the work permitted the report to be brought up to the close of 1903, and the results were published in 1904. A further bulletin in 1905 added figures for 1904, and the inquiry has now become an annual undertaking. For 1904 information was secured covering 350 occupations in 3,732 establishments, engaged in 42 industries. Index numbers were used, the base being the averages during the ten-year period 1890 to 1899. The weights used were the aggregate wages paid as reported at the census of 1900. An illustrative table follows:

TABLE XL.—Course of wages and hours of labor, 1890 to 1904, when weighted according to aggregate wages paid in each industry, as reported by the census of 1900.¹

[Relative numbers computed on basis of average for 1890-1899=100.0.]

YEAR.	EMPLOYEES.		HOURS PER WEEK.		WAGES PER HOUR.	
	Relative number.	Per cent of increase (+) or decrease (-) in 1904 as compared with year specified. ²	Relative number.	Per cent of increase (+) or decrease (-) in 1904 as compared with year specified. ²	Relative number.	Per cent of increase (+) or decrease (-) in 1904 as compared with year specified. ²
1890.....	94.8	+32.6	100.7	-4.8	100.3	+16.7
1891.....	97.3	+29.2	100.5	-4.6	100.3	+16.7
1892.....	96.2	+26.7	100.5	-4.6	100.8	+16.1
1893.....	99.4	+26.5	100.3	-4.4	100.9	+16.0
1894.....	94.1	+33.6	99.8	-3.9	97.9	+19.5
1895.....	96.4	+30.4	100.1	-4.2	98.3	+19.0
1896.....	98.6	+27.5	99.8	-3.9	99.7	+17.4
1897.....	100.9	+24.6	99.6	-3.7	99.6	+17.5
1898.....	106.4	+18.1	99.7	-3.5	100.2	+16.8
1899.....	112.1	+12.1	99.2	-3.3	102.0	+14.7
1900.....	115.6	+ 8.7	98.7	-2.8	105.5	+10.9
1901.....	119.1	+ 5.5	98.1	-2.2	108.0	+ 8.3
1902.....	123.6	+ 1.7	97.3	-1.4	112.2	+ 4.3
1903.....	126.5	- 0.6	96.6	-0.7	116.3	+ 0.6
1904.....	125.7	.....	95.9	.....	117.0	.....

¹ Bulletin of the Bureau of Labor, No. 59, July, 1905, page 12.

² The figures in this column give, opposite each year, the per cent of increase or decrease (indicated by + or -) which the 1904 figures show as compared with the year specified. Thus, opposite the year 1890, under employees, appears +32.6; this shows that the increase in the number of employees in 1904 as compared with 1890 was 32.6 per cent. Opposite 1890, under hours per week, appears -4.8; this shows that the decrease in the hours of labor per week in 1904 as compared with 1890 was 4.8 per cent. In like manner under wages per hour, appears +16.7; this shows that the increase in the wages per hour in 1904 as compared with 1890 was 16.7 per cent. The figures opposite each year should be read in like manner. Opposite the year 1904, of course, no figures can be placed.

Employees and wages.—As an outcome of a difference between the census of manufactures of 1890 and that of 1900 in the computation of the annual average earnings, which rendered the results incomparable,¹ a supplementary inquiry into wages and wage-earners was conducted by Dr. Davis R. Dewey in order to ascertain more accurately the trend of wages during the decade. The volume entitled "Employees and Wages," in which the results of the investigation were embodied, is a most scientific presentation of the subject.

¹ Twelfth Census, Manufactures, Part I, page cxxv.

The investigation was limited to 34 of the most important and stable industries, and the pay rolls, for one normal pay period, of 720 establishments were transcribed for both census years, whenever available. Each employee was shown upon the schedule according to his actual rate of earning for the period covered by the pay roll selected. The establishments were distributed throughout the country, so that comparisons could be made within geographic divisions wherein economic conditions regulating wages would be similar.

For purposes of comparison all rates were reduced to rates by the hour and week, and tables prepared by occupations and establishments. Throughout the report wage-earners are distributed according to wage groups, with 50 cents between each group in case of weekly rates and 1 cent in case of hourly rates. To facilitate comparisons between the two census periods and to aid in analysis, Doctor Dewey made use of cumulative percentages and the median and quartiles. The manner of presentation is well illustrated by Table XLI.

TABLE XLI.—Use of cumulative percentages, medians, and quartiles.¹

RATES PER WEEK (DOLLARS).	ACTUAL NUMBER AT RATE SPECIFIED.		PERCENTAGE IN THE GROUP.		CUMULATIVE PERCENTAGE.		MEDIAN AND QUARTILE GROUPS.	
	1900	1890	1900	1890	1900	1890	1900	1890
Total.....	759	572	100.0	100.0	.....	.....	.....	.....
3.50 to 3.99.....	7	5	0.9	0.9	100.0	100.0	.....	.....
4.00 to 4.49.....	10	7	1.3	1.2	99.1	99.1	.....	.....
4.50 to 4.99.....	23	15	3.1	2.6	97.8	97.9	.....	.....
5.00 to 5.49.....	31	9	4.1	1.6	94.7	95.3	.....	.....
5.50 to 5.99.....	12	3	1.6	0.5	90.6	93.7	.....	.....
6.00 to 6.49.....	53	40	7.0	7.0	89.0	93.2	.....	.....
6.50 to 6.99.....	7	3	0.9	0.5	82.0	86.2	.....	.....
7.00 to 7.49.....	22	6	2.9	1.1	81.1	85.7	.....	.....
7.50 to 7.99.....	46	37	6.1	6.5	78.2	84.6	Q.	.....
8.00 to 8.49.....	5	5	0.6	0.9	72.1	78.1	.....	.....
8.50 to 8.99.....	1	2	0.1	0.3	71.5	77.2	.....	.....
9.00 to 9.49.....	92	42	12.2	7.3	71.4	76.9	.....	Q.
9.50 to 9.99.....	22	6	2.9	1.1	59.2	69.6	.....	.....
10.00 to 10.49.....	24	30	3.2	5.2	56.3	68.5	.....	.....
10.50 to 10.99.....	60	45	7.9	7.9	53.1	63.3	M.	.....
11.00 to 11.49.....	25	31	3.3	5.4	45.2	55.4	.....	.....
11.50 to 11.99.....	1	5	0.1	0.9	41.9	50.0	.....	M.
12.00 to 12.49.....	61	61	13.2	10.7	41.8	49.1	.....	.....
12.50 to 12.99.....	2	3	0.3	0.5	28.6	38.4	.....	.....
13.00 to 13.49.....	3	1	0.4	0.2	28.3	37.9	.....	.....
13.50 to 13.99.....	75	62	9.9	10.8	27.9	37.7	Q.	.....
14.00 to 14.49.....	7	4	0.9	0.7	18.0	26.0	.....	.....
14.50 to 14.99.....	1	1	0.1	0.2	17.1	26.2	.....	.....
15.00 to 15.49.....	62	72	8.2	12.6	17.0	26.0	.....	Q.
15.50 to 15.99.....	13	2	1.7	0.3	8.8	13.4	.....	.....
16.00 to 16.49.....	1	1	0.1	0.2	7.1	13.1	.....	.....
16.50 to 16.99.....	16	22	2.1	3.8	7.0	12.9	.....	.....
17.00 to 17.49.....	2	2	0.3	0.3	4.9	9.1	.....	.....
17.50 to 17.99.....	1	1	0.1	0.2	4.6	8.8	.....	.....
18.00 to 18.49.....	19	17	2.5	3.0	4.5	8.6	.....	.....
18.50 to 18.99.....	1	1	0.1	0.2	2.0	5.6	.....	.....
19.00 to 19.49.....	1	1	0.1	0.2	1.9	5.4	.....	.....
19.50 to 19.99.....	6	3	0.8	0.5	1.8	5.2	.....	.....
20.00 to 20.49.....	4	2	0.5	0.3	1.0	4.7	.....	.....
20.50 to 20.99.....	.....	1	.....	0.2	0.5	4.4	.....	.....
21.00 to 21.49.....	3	6	0.4	1.1	0.5	4.2	.....	.....
21.50 to 21.99.....	.....	2	.....	0.3	0.1	3.1	.....	.....
22.00 to 22.49.....	.....	1	.....	0.2	0.1	2.8	.....	.....
22.50 to 22.99.....	.....	4	.....	0.7	0.1	2.6	.....	.....
23.00 to 23.49.....	.....	4	.....	0.7	0.1	1.9	.....	.....
23.50 to 23.99.....	.....	1	.....	0.2	0.1	1.2	.....	.....
24.00 to 24.49.....	.....	3	.....	0.5	0.1	1.0	.....	.....
24.50 to 24.99.....	.....	.....	.....	.....	0.1	0.5	.....	.....
25.00 to 25.49.....	1	3	0.1	0.5	0.1	0.5	.....	.....

¹ Twelfth Census, Special Reports, Employees and Wages, page xxvi.

It is evident from the table that, by means of the cumulative percentages, the proportion of the total number of wage-earners receiving as much as or more than the initial amount of each group is indicated.

The cumulative percentages also simplify the placing of the median and quartiles. The usefulness of the cumulative percentage is apparent in this table, since it discloses at a glance that for the wage-earners tabulated therein there was a decrease in wages between 1890 and 1900, although, obviously, it can not afford a quantitative measure of the decrease.

The median is used to show in what group the employee midway between the lowest and the highest paid employee falls, and the quartiles indicate, respectively, the group in which the employee falls who stands midway between the highest paid and the middle employee, and that in which falls the employee who stands midway between the middle and the lowest paid employee. Thus, if two periods are compared, the median and the quartiles will indicate clearly whether there was a rising or a falling in the groups wherein they appear at either of the two periods.

AVERAGE ANNUAL EARNINGS.

There is such an element of inaccuracy entering into the average number of wage-earners, as hitherto reported at the different censuses, that at the present census no computations of average annual earnings have been made. At past censuses this average has been computed by dividing the wages paid to each class by the average number of wage-earners in each class; and the total wages paid, by the total average number. The problem presents serious difficulties, but it is believed that they can be overcome or minimized.

Practical method.—The method to be employed in endeavoring to ascertain the average number of wage-earners and the wages paid must be such as is practicable, the primary object of a general census being kept constantly in view, and the limitations of time and expense being fully appreciated. It is not feasible to secure the actual number of wage-earners and the actual yearly earnings of each. An enumeration, from time book or pay roll, of every person—man, woman, and child—employed for any length of time, from a few hours up to several months or a year, in all establishments in all industries throughout the United States, is impossible, when the severe limitations of a census are considered. An accounting of the wages paid these wage-earners separately for the entire year is subject to the same insuperable difficulties. But if a detailed inquiry into wages and wage-earners in all industries is impracticable as a part of a regular census, the question arises whether it would be possible to make it as a separate investigation by the Bureau of the Census. That such a course is not practicable is shown by the limited inquiry of 1880 into daily rates of pay, and that of 1900 into hourly and weekly rates. These inquiries, although for only a comparatively few establishments, consumed, the one three and the other two years, and were conducted at much expense. To extend them to cover all the establishments in every

industry in the country would probably more than exhaust the time between one census and another and certainly entail a very great cost, while the resultant volumes of primary tables, summaries, and analyses would be appalling. These methods are available, therefore, only for representative establishments.

Detailed inquiries being thus impracticable, the only available method of ascertaining the average annual earnings, if the computation of these is to be continued, is that now employed—namely, the use of the average for men, women, and children, respectively, as divisors and the total wages paid and the amount paid each class as dividends—subject to the improvements hereinafter mentioned. This method, requiring a return by the manufacturer of what purports to be the average number of wage-earners and the total wages paid during the year, was early recognized as the only practicable one, and at the census of 1850 the "average number" was asked, whereas previously the "number" had been required.

This method has been constantly improved. At first nothing but a bare statement of the annual average number was asked for; then came a request for information concerning the months and parts of months in operation, the hours per week and per day, the overtime, and the greatest and least number employed at any one time, in order that the accuracy of this annual average might be tested. It was also sought to secure tables of weekly rates, with a view, in part, to further verification. These tables and the time in operation constituted the principal sources of verification in 1890. Finally the average each month was required, the annual average being computed from these averages, verified by time in operation. A table of actual earnings for the week during which the greatest number of wage-earners was employed was afterwards secured, not only as a showing of value in itself, but as having an important bearing upon the return of the annual average number of wage-earners and total wages. During all this time a better classification of salaried employees and wage-earners was being made, resulting in a more careful segregation of the wage-earners, so that they might be more strictly comparable from one census to another.

As has already been stated, the foregoing method of computing the average annual earnings is subject to certain defects, which were set forth at the census of 1900.¹ It must never be assumed that the result shows the average annual earnings of a machinist, or of a weaver, or of a laborer, or of a wage-earner of any other occupation; or that it is the earnings of the average of persons working a whole year, or those of a group employed six months, or a month, or any other period of time. The average is simply, according to the explicit statement accompanying the announcement of the result of the computation, the annual earnings in each case of a complex average unit or artificial

¹Twelfth Census, Manufactures, Part I, page cxi.

person. This average unit is the average of wage-earners of heterogeneous occupations and rates of pay, working for all varying lengths of time, in each industry, each state, and the United States, respectively. But it gives a quantitative statement of average annual earnings, which is the only statement easily grasped; presents a general idea regarding wage-earners as a whole; and furnishes results by which, character of element and methods of computation being clearly stated and understood, complex conditions can be interpreted.

Admitting therefore that the wage-earners making up the average number are of all sorts of skill and all grades of pay, and that they work for widely differing lengths of time, a comparison of one year's average earnings of these composite units for industries, for states, and for the United States, with another year's average earnings, on the correct basis of enumeration, measures the movement and has a practical value. The important requisites are that from census to census methods remain the same, and that the average number be obtained with all possible accuracy. Efforts to attain these conditions have not yet proved wholly successful.

SPECIAL COMMITTEE'S INQUIRY.

That the method of obtaining the average number of wage-earners and of computing average wages might be further improved, the Director of the Census, on January 15, 1906, appointed William A. Countryman, Francis C. Wilson, and Zach C. Elkin, of the division of manufactures, a committee "to investigate this

question with such celerity as is compatible with thoroughness and report their conclusions in writing."

The committee submitted the following report:

MAY 7, 1906.

MR. W. M. STEUART,

Chief statistician, division of manufactures.

SIR:

The committee on annual average earnings herewith presents its final report. The questions submitted to it by the Director in his communication of January 15, 1906, were as follows:

I. Is the present method of computing average annual earnings identical with that adopted at the Twelfth Census?

II. Is there any reason to believe that the return of the number of employees and wages paid has not been accurately and honestly made?

III. Do the averages, as computed from the schedules, conform to the actual facts, as found in typical establishments and determined by actual experience in selected communities?

IV. Are these averages confirmed by the computations of the Dewey report?

V. How do these averages compare with the wage returns collected by the Bureau of Labor and by state bureaus of labor?

VI. Is there any more scientific method for ascertaining average wages than that adopted at the Twelfth Census, and now employed in the census of 1905?

The committee finds as follows, the numerals referring to the Director's questions:

I. The method of computing annual average earnings at the census of 1905 was the same as that adopted at the census of 1900.

II. That the return of the number of wage-earners and of the wages paid was honestly made is not doubted, but their accuracy is open to question.

III. The results of fieldwork during the week ending April 28, 1906, with an experimental schedule formulated by the committee to test the average number of wage-earners and wages paid in typical establishments in selected communities furnishes the only basis so far for an answer to this question.

A summary of the information concerning wage-earners as reported upon the Census schedule and the special schedule for the same establishments is submitted, as follows:

The average number of wage-earners, total amount paid to wage-earners, and the annual average earnings for seven establishments as computed from the Census schedules for 1905, and the special wage investigation schedules, showing the difference in each case (+ or - the Census schedule) and the per cent of difference between them, assuming the returns upon the special schedule to be correct.

Establishment.	KIND OF PRODUCT.	AVERAGE NUMBER WAGE-EARNERS.			TOTAL AMOUNT PAID TO WAGE-EARNERS.			ANNUAL AVERAGE EARNINGS.			PER CENT OF DIFFERENCE.		
		Census schedule.	Special schedule.	Difference (+ or - Census schedule).	Census schedule.	Special schedule.	Difference (+ or - Census schedule).	Census schedule.	Special schedule.	Difference (+ or - Census schedule).	Average number wage-earners.	Total amount paid to wage-earners.	Average earnings.
	Average.....	196	161	-35	\$112,505	\$108,204	-\$4,299	\$574	\$672	+\$98	-17.9	- 3.8	+17.1
1	Ingrain carpets.....	80	45	-35	21,156	22,525	+1,369	264	500	+236	-43.7	+6.5	+89.4
2	Art squares.....	96	77	-19	49,374	44,255	-5,119	514	574	+60	-10.8	-10.4	+11.7
3	Foundry and machine shop.....	383	330	-53	221,631	220,064	-1,567	578	666	+88	-13.8	-0.7	+15.2
4	Foundry and machine shop.....	485	433	-52	330,395	316,231	-14,164	681	730	+49	-10.7	-4.3	+7.2
5	Furniture (fine cabinet work).....	128	103	-25	88,500	72,718	-15,782	601	706	+105	-10.5	-17.8	+ 2.2
6	Glass (bottles and jars).....	114	70	-44	55,876	155,876	.....	490	798	+308	-38.6	.....	+62.9
7	Sewing silk thread and machine twist.....	83	73	-10	20,607	25,745	+5,138	248	352	+104	-12.9	+24.9	+41.9

¹ The special agent did not obtain the total amount of wages paid by this establishment, and the amount reported upon Census schedule has been accepted for purposes of comparison.

The principal source of difference upon the Census schedule is found to be contained in the average number of wage-earners. The table shows that in every case the true average as derived from the special investigation was less than the averages upon the Census schedules. When the totals for the seven establishments are averaged, there is a variation from the true figures of 17.9 per cent, which in individual cases ranges from 10.7 to 43.7 per cent.

The total amount paid to wage-earners showed an average

variance of only 3.8 per cent from the actual figures, varying in different cases from seven-tenths of 1 per cent to 24.9 per cent.

The average annual earnings computed from the average number of wage-earners and total amount paid to wage-earners, showed an average departure from actual figures, as determined by the special investigation, of 17.1 per cent, but the variations were wide, ranging from 2.2 per cent for establishment number 5 to 89.4 per cent in the case of establishment number 1.

Seven wage schedules were secured, during the field test work, from the books of the companies visited. In 2 establishments no time was kept, the work being by the piece; estimates had to be made on the basis of quantity produced, and calculated for a few time workers, on the deviation from their normal two weeks' rate; in 3 the time was by hours, and in 2 it was by days. These differences disclose some of the difficulties attending a proper ascertainment of the average number of wage-earners.

In one of the establishments the pay roll was not kept so that the number of men and women could be separately ascertained for the whole year by actual count, without too great an expenditure of time, and then not with exactness. Nothing but a total average, irrespective of sex, could be attempted. Names were written in, of men and women alike, by looms, with few initials and no Christian designations, by which sex might be disclosed. For one week of the year the superintendent indicated for the special agent as best he could the men and women, and they were found to be about equally divided. No time whatever was kept. Just before each weaver's name the number of yards woven in two weeks was written, and after it the earnings. It was assumed by the special agent in conference with the manager that an average per loom based upon the actual product of the 62 looms in the establishment—each loom having 1 weaver—for the busiest two weeks would furnish the best method of getting the average number of weavers employed every two weeks, and, consequently, for the year. The average product of the looms was found to be 403 yards. This divided into the total yards woven each two weeks gave the average number of weavers. The number of pounds wound and spooled every two weeks had been entered on the pay roll just before the name of each winder and spooler. The average production the busiest two weeks was 1,401 pounds. This divided into the pounds wound and spooled every two weeks gave the average number of wage-earners in this department. There was on the pay roll a list of time workers, but no time was entered, earnings only being shown. The full two weeks' wage being known, a calculation was made of time lost, according to the lower earnings. The time of burlers was calculated according to the amount earned by them in a full two weeks.

The pay roll of another establishment contained the days employed of a few persons working on time. The other wage-earners were pieceworkers, and the time of some of these was calculated on the basis of a certain maximum and minimum number of pieces, fixed by the manager for this purpose as the standard production for two weeks. The time for winders and spoolers and certain others was estimated on a maximum and minimum standard assumed by the manager to be a full two weeks' earnings.

In a third establishment the total number of men employed each week, irrespective of the time they worked, was taken, in addition to the total number of hours they worked and the total amount paid in wages. The averages were computed by dividing the total number of hours during which the factory was in operation each week into the total number of hours paid for in that week. The company paid only the one rate per hour, whether the plant ran "regular time" or "overtime."

In another establishment paying by the hour there was found a bonus system of "extra time," which is given to each man in the plant over and above his regular rate of pay when he works overtime. It really amounted to about "time and one-half" for all overtime in excess of two hours in any one day.

There was some difficulty in the ascertainment of the average number of wage-earners, even when a time book kept by days was found. The days and fractions of days worked were not totaled, and some of the entries for fractional days were accompanied by symbols, the meaning of which had to be interpreted by the book-

keeper or other representative of the company. To make an accurate summation of days worked required considerable time and care.

IV. There is no way of comparing the census averages with the Dewey computations, which are for rates of earnings by the hour or week in a limited number of establishments for 1890 and 1900. No average number of wage-earners or annual average earnings are shown. The increase in rates of earnings during the decade can not be taken to indicate that average annual earnings increased for hours of employment may have decreased. Whatever the bearing of the increase of rates upon average annual earnings for the decade 1890 to 1900, it would prove nothing with reference to earnings from 1900 to 1905. The committee, however, made tests with the Dewey schedules, the result of which was set forth as follows in its preliminary report, under date of February 20, 1906:

The tests made with the schedules taken in the special investigation for the census year 1900 by Doctor Dewey were in the nature of a comparison of these schedules with the schedules previously taken for the Twelfth Census from the same establishments. The idea was to select a number of establishments that by this test appeared to have been correctly reported (reducing the census average for a year to a weekly average), and to figure out the average productivity per wage-earner, using the value of products in the Census schedule as a base. This productivity was compared with that of the same establishment at the census of 1905 to disclose, if possible, whether the average number of wage-earners reported in that year was smaller or larger than that required to produce substantially the same output in 1900. This method was found to be impracticable when applied to a large number of establishments, as irreconcilable differences appeared between the number reported for a normal week in Doctor Dewey's schedule and the average number reported in the Census schedule.

V. The wage returns of the Bureau of Labor can not be compared with those of the Census. The committee reported its tests as follows in its preliminary report cited above:

The schedules of the Bureau of Labor show for certain establishments the number of wage-earners employed in selected occupations at fixed rates per hour, day, or week. Actual earnings do not appear, except in the case of pieceworkers, and in no case are all the occupations of the establishment reported. Since the reports of the Census Office show actual earnings of all wage-earners and thus far disregard rates and occupations, the task of reducing the Bureau of Labor results to a comparable basis seemed hopeless from the start. However, an attempt was made to compare the figures of Inquiry 11 on the Census schedule of 1905 with the wage-earners reported on the Bureau of Labor schedule for the same establishment. This was found to be impracticable on account of the comparatively small number of occupations reported in the different industries by the Bureau of Labor. In a number of instances these occupations represented less than one-third as many wage-earners as the Census schedules show.

As for the wage returns of the few state bureaus that gather them, the bases are so narrow and the methods so dissimilar that comparisons can not be satisfactorily made.

VI. There is a more scientific method of ascertaining average wages. This method is impracticable for the entire census, but perfectly practicable for a limited inquiry at each census, and is recommended for adoption. In this way not only can accurate wage returns be secured for certain leading establishments, but a rule can be determined by which the accuracy of other wage returns can be judged. A schedule has been prepared by which for timeworkers and pieceworkers alike the exact number of days and fractions of days, or the hours worked, with the wages paid, can be ascertained by weeks from the books of typical establishments in selected communities. A copy of this schedule is herewith appended.

The schedule and instructions provide for securing at every census the actual number of wage-earners, the actual time worked—days, fractions of days, hours, and fractions thereof—and the total wages paid, in typical establishments, having the same kind of products, and within the same geographic limits. From these

xciii

[illegible]

WEEK ENDING—	HOURS EMPLOYED AND WAGES PAID.		Average number of wage-earners. (To be com- puted in the Census Office.)	WEEK ENDING—	HOURS EMPLOYED AND WAGES PAID.		Average number of wage-earners. (To be com- puted in the Census Office.)
	Hours.	Wages.			Hours.	Wages.	
* *	* *	* *	* * *	* *	* *	* *	* * *
Total.....							

Under "less than day—total hours" the agent will enter the

number of hours aggregated by all the wage-earners employed less than a day. If it is impossible to obtain this information, then the number of wage-earners so employed should be entered under "remarks," with all the information obtainable which would shed light upon the probable number of hours employed. Overtime must be included in this line in accordance with instructions on page —.

Where pay rolls covering two weeks are encountered, the possible number of days employed will be embraced in the headings of both the left and right hand sets of columns, which will be considered as one set for this purpose, running from the column headed "fourteen days" in the left-hand set to the column headed "less than one day" in the right-hand set. In this case no use will be made of the column for "less than day" and "amount paid in wages" of the left-hand set and the agent will strike from the headings of the same set the numerals 7, 6, 5, 4, 3, 2, and 1. The column of the right-hand group headed "week ending" will also be omitted.

Wage-earners.—The distinction between wage-earners and those employed in a purely supervisory or clerical capacity should be carefully observed and should conform to the distinction adopted for census of manufactures, 1905. Whenever foremen receive wages and perform work similar to that of those under their charge they should be included, but unless they perform such work they should not be included, even though they receive wages and appear upon the pay roll among the wage-earners.

Wage-earners working in shifts.—When wage-earners work in shifts of from seven to twelve hours, they must be tabulated as though the normal factory day was composed of the number of hours in each shift instead of the aggregate hours in all shifts, and thus the number entered on the schedule for each period of the week (or two weeks) will be the sum of all the wage-earners in all the shifts during the period.

Amount paid in wages.—The total amount paid in wages must be entered in this column for each week or two weeks tabulated.

In cases where more than one schedule is necessary for an establishment, the total amount paid for wages should be returned on only one of the schedules, preferably that upon which the men 16 years and over are returned. The agent is not expected to make any division of wages between men, women, and children unless especially instructed to do so.

Whenever the total amount paid for wages does not appear upon the pay roll and is not obtainable from other books or records of the establishment, no return should be made other than a note explaining fully why the information was omitted.

Whenever the total amount paid which appears on the pay roll includes sums received by salaried employees, or wages paid employees not included under "number of wage-earners," care should be taken to deduct such amounts from the total sum on the pay roll before entering it upon the schedule.

Pay rolls kept by hours.—When pay rolls kept by hours are encountered, the form upon the last page of the schedule must be used. The dates should be entered as instructed above. Under "hours employed and wages paid" the total number of hours worked by all wage-earners and the total amount paid them should be entered for each week or two weeks, as the case may be. Care must be taken to exclude from both the number of hours and total amount paid time worked by and amount paid to employees who should not be counted as wage-earners.

Pieceworkers.—Pieceworkers are employees who are paid a certain amount per fixed unit of product regardless of the time consumed in the production. The principal difference between pieceworkers and timeworkers is that the latter receive a fixed amount for each equal unit of time employed independent of the quantity of work done, while the former receive a fixed amount for every unit of product produced, regardless of the time taken in the production. In the great majority of cases, however, pieceworkers and timeworkers will be found to be similar, in that they both work throughout the normal working day of the factory, and therefore it follows that, for the purposes of this investigation, they will be combined upon the same schedule.

In all cases where there is no effort made to keep a record of the presence of the pieceworkers in the factory from which a definite tabulation can be

made, as in the case of timeworkers, no attempt to obtain a schedule should be made.

Method of computing from the schedule the true annual average earnings.—When the information has been transcribed from the pay rolls according to instructions, the schedule will show the number of wage-earners employed weekly throughout the year, distributed according to the number of days employed and fractions of days in hours in each week or two weeks, as the case may be; and the amount of money paid them. If the pay roll transcribed upon the schedule is weekly, the processes of computation that will be performed in the Office may be set down in their order, as follows:

(1) The reduction of the number of hours employed overtime, which will be returned under "less than day—hours," to normal days of work for one wage-earner. This would be accomplished by dividing the total number of hours returned, by the number of hours contained in a normal working day. The result would be the reduction of the total hours of overtime to normal days during which one wage-earner would be employed. Therefore one extra wage-earner would be added to the column headed with the number of days equivalent to that obtained by this reduction.

(2) The vertical columns headed 6, 5, 4, 3, 2, and 1 will then be added and a total obtained for fifty-two weeks, a horizontal line being allowed on the schedule for each week in the year. This will give a total of the weekly number of wage-earners employed throughout the year, distributed by the number of days in the week they were occupied. Those employed less than six days must be reduced to a six-day basis, presuming that six days form a normal working week of the establishment, in order to secure a number which may be divided by 52 to produce the true average number employed for each week in the year. This will be accomplished, first, by reducing the number of wage-earners employed 5, 4, 3, 2, and 1 day to the time of one wage-earner by multiplying the number of wage-earners by the number of days employed, and, second, by dividing these results by 6. The resulting totals will be added to the total number of wage-earners employed six days in the week already entered upon the schedule, and the sum divided by 52, which will give the true average number of wage-earners employed throughout the year.

(3) Using the true average number of wage-earners as the divisor into the total amount paid to wage-earners for the year, which would be obtained from the schedule by addition, the resulting quotient would be the correct average annual earnings.

(4) If the pay rolls transcribed cover two weeks, the method of procedure will be the same as in the case of six days, excepting that the number of wage-earners will be reduced to a twelve-day basis instead of a six-day, and the total for the year will be divided by 26 instead of 52. It will be understood from the instructions accompanying the schedule attached herewith that the two sets of columns upon the schedule are to be considered as one in case a two weeks' pay roll is encountered.

(5) In case the agent discovered that the total number of hours worked weekly by the wage-earners was shown upon the pay roll of an establishment, he would use page 4 of the schedule. The schedule when thus filled out would show the number of hours worked weekly by all employees and the wages paid during the same period. By dividing the total hours worked by all the operatives, by the total number of hours the factory was in operation during each week, the average number of operatives employed each week will be ascertained; and the succeeding computations will be readily understood from the instructions above.

TIME IN OPERATION.

Reports were received at the census of 1905 from 216,262 establishments that were in active operation during all or a portion of the calendar year 1904. The period of activity varied greatly. Some establishments were in operation continuously, others only for short periods varying from a few days to a number of months. Some operated on full time and others on half time or for but a portion of the normal day.

Therefore, to determine the industrial activity of the period it is necessary to consider the number of days the establishments were in operation, the amount of extra time they worked, and the number of hours of employment under normal conditions. Information of this character was collected from each establishment in reply to the following inquiry:

Time the factory was in operation:

Number of days in operation during the year.....
 Number of hours per day (under normal conditions).....
 Number of hours per week (under normal conditions).....
 Extra time during the year, total number of hours.....

While the number of hours worked each day and the

amount of extra time are important factors in determining the relative industrial activity, the number of days in operation during the year was the only feature that it was practicable to tabulate and present in the reports for the census of 1905.

Each establishment reporting was therefore assigned to one of 12 classes, according to the number of days in operation, and the statistics are shown in detail by states and territories and by industries in Tables 15 and 16. The totals for the United States and for each of the 14 general groups of industries are given in Table XLII.

TABLE XLII.—DAYS IN OPERATION, BY GROUPS OF INDUSTRIES: 1905.

GROUP.	NUMBER OF ESTABLISHMENTS CLASSIFIED ACCORDING TO DAYS IN OPERATION.													
	Total.	30 and less.	31 to 60.	61 to 90.	91 to 120.	121 to 150.	151 to 180.	181 to 210.	211 to 240.	241 to 270.	271 to 300.	301 to 330.	331 to 366.	Not re- ported.
United States.....	216,262	1,760	4,559	5,175	6,808	8,801	6,482	9,878	7,020	10,768	67,402	79,532	6,104	1,883
Food and kindred products.....	45,790	659	1,496	1,355	1,255	1,593	1,543	2,389	1,076	2,114	10,377	17,953	3,232	148
Textiles.....	17,042	40	95	122	178	315	275	501	564	1,160	7,016	5,753	61	72
Iron and steel and their products.....	14,239	32	77	138	166	246	217	323	316	646	5,408	6,439	146	55
Lumber and its remanufactures.....	32,726	499	1,581	1,758	2,504	3,051	1,752	2,840	1,866	2,482	8,527	5,621	122	123
Leather and its finished products.....	4,945	5	21	41	63	89	90	99	81	214	2,111	2,114	11	6
Paper and printing.....	30,787	34	108	171	236	299	241	365	232	454	9,507	17,524	368	1,188
Liquors and beverages.....	6,381	123	227	242	217	325	205	279	194	215	1,566	2,494	270	18
Chemicals and allied products.....	9,680	143	270	318	459	490	388	491	238	306	2,476	3,013	1,015	75
Clay, glass, and stone products.....	10,775	134	389	553	882	1,140	804	902	506	770	2,567	1,914	103	21
Metals and metal products, other than iron and steel.....	6,310	7	15	30	59	75	64	90	82	206	2,531	3,017	112	22
Tobacco.....	16,828	48	146	241	424	650	438	807	556	1,260	6,814	5,182	73	99
Vehicles for land transportation.....	7,285	3	23	41	47	61	55	82	102	186	2,552	3,785	334	14
Shipbuilding.....	1,097	2	7	15	53	55	43	74	43	77	442	280	2	4
Miscellaneous industries.....	12,377	31	104	150	265	442	369	546	444	678	1,608	4,443	250	38

The reports of the Twelfth Census contain no information concerning the time in operation, and accordingly no comparisons can be made to ascertain the changes indicated by the reports of the two years.

There were 1,883 establishments included in the census of 1905 that failed to report the number of days in operation, but they form such a small proportion, nine-tenths of 1 per cent of the total, that their omission does not disturb the relation of the numbers shown for the different groups in Table XLII.

It is the practice in some reports presenting statistics on this subject to ascertain the total number of days that all establishments were in operation during the year, and to divide this aggregate by the number of establishments in order to ascertain the average number of days for each establishment; and in others to multiply the number of days reported for each establishment by the average number of persons employed during the year and divide the sum of the products by the total average number reported for all establishments in order to ascertain the average number of days in operation. If the different units considered in calculations of this character are reliable, the results are of value as indicating the relative activity

in different industries and in different sections of the country. But the uncertainties attending the computation of the average number of wage-earners reported to the Census,¹ and the impossibility of making proper allowance for overtime or short time, for periods that the establishments are operated on half or other fraction of full time, or for the time that the full quota of wage-earners is not employed, lend such a degree of inaccuracy to the Census figures that they should not be used for this purpose.

It was the exception for an establishment to keep an accurate record of the extra time during the year, and in the majority of instances the number of hours reported for such time was an estimate. On the whole, the grouping of the establishments according to the number of days in operation appears to be the only practical method of utilizing the information furnished in reply to this inquiry.

Table XLIII shows the percentage of the total number of establishments in the United States and in each of the 14 general groups of industries that were assigned to each of the 12 classes according to the number of days in operation.

¹ See page lxxxix.

MANUFACTURES.

TABLE XLIII.—PER CENT DISTRIBUTION, BY DAYS IN OPERATION, OF TOTAL NUMBER OF ESTABLISHMENTS IN EACH GROUP OF INDUSTRIES: 1905.

GROUP.	PER CENT DISTRIBUTION BY NUMBER OF DAYS IN OPERATION.													
	All es- tablish- ments.	Establishments in operation—												
		30 days and less.	31 days to 60.	61 days to 90.	91 days to 120.	121 days to 150.	151 days to 180.	181 days to 210.	211 days to 240.	241 days to 270.	271 days to 300.	301 days to 330.	331 days to 360.	Not re- ported.
United States.....	100.0	0.8	2.1	2.4	3.1	4.1	3.0	4.6	3.2	5.0	31.2	36.8	2.8	0.0
Food and kindred products.....	100.0	1.4	3.3	3.0	2.7	3.5	3.4	5.2	3.7	4.6	22.7	39.2	7.0	0.3
Textiles.....	100.0	0.2	0.6	0.7	1.0	1.9	1.6	2.9	3.3	6.8	46.5	33.8	0.3	0.4
Iron and steel and their products.....	100.0	0.2	0.6	1.0	1.2	1.7	1.5	2.3	2.4	4.5	38.0	45.2	1.0	0.4
Lumber and its remanufactures.....	100.0	1.5	4.8	5.4	7.6	9.3	5.3	8.7	5.7	7.6	26.1	17.2	0.4	0.4
Leather and its finished products.....	100.0	0.1	0.4	0.8	1.3	1.8	1.8	2.0	1.7	4.3	42.7	42.8	0.2	0.1
Paper and printing.....	100.0	0.1	0.3	0.5	0.8	0.9	0.8	1.2	0.7	1.5	31.2	56.9	1.2	3.9
Liquors and beverages.....	100.0	1.9	3.6	3.8	3.4	5.1	3.2	4.4	3.0	3.4	24.5	30.1	4.3	0.3
Chemicals and allied products.....	100.0	1.5	2.8	3.3	4.7	5.1	4.0	5.1	2.4	3.1	25.6	31.1	10.5	0.8
Clay, glass, and stone products.....	100.0	1.2	3.6	5.1	8.2	10.6	7.5	8.4	5.5	7.1	23.8	17.8	1.0	0.2
Metals and metal products, other than iron and steel.....	100.0	0.1	0.2	0.5	0.9	1.2	1.0	1.4	1.3	3.3	40.1	47.8	1.8	0.4
Tobacco.....	100.0	0.3	0.9	1.4	2.5	3.9	2.6	5.3	3.3	7.5	40.5	30.8	0.4	0.6
Vehicles for land transportation.....	100.0	(¹)	0.3	0.6	0.6	0.8	0.8	1.1	1.4	2.6	35.0	52.0	4.6	0.2
Shipbuilding.....	100.0	0.2	0.6	1.4	4.8	5.0	3.9	6.8	3.9	7.0	40.3	25.5	0.2	0.4
Miscellaneous industries.....	100.0	0.3	0.8	1.2	2.1	3.6	3.0	4.4	3.6	5.5	37.2	35.9	2.1	0.3

¹ Less than one-tenth of 1 per cent.

Many establishments reported the number of days in the year exclusive of Sundays and holidays as the actual time in operation. This is indicated by the fact that the two groups representing the establishments in operation from 271 to 330 days contain 147,024 establishments, or 68 per cent of the total; although the majority of all the establishments were in operation more than 270 days, the table indicates a considerable variation in the prevailing time of operation in the different industries. For example, 56.9 per cent of the establishments in the paper and printing industries were in operation from 301 to 330 days, while only 17.2 per cent of those for "lumber and its remanufactures," and 17.8 per cent of those engaged in the manu-

facture of clay, glass, and stone products were assigned to this group. The manufacture of chemicals and allied products reported the largest proportion, 10.5 per cent, of establishments in operation 331 days or over.

Accepting 301 days or over as representing the period of maximum employment, it appears that 85,636 establishments, or 39.6 per cent of the total, were so employed.

The relative contribution of the different groups of industries to the total number of establishments shown for each of the periods of operation is shown in Table XLIV.

TABLE XLIV.—PER CENT DISTRIBUTION, BY GROUPS OF INDUSTRIES, OF TOTAL NUMBER OF ESTABLISHMENTS IN OPERATION FOR THE SPECIFIED NUMBER OF DAYS: 1905.

GROUP.	PER CENT DISTRIBUTION BY GROUPS OF INDUSTRIES.													
	All es- tablish- ments.	Establishments in operation—												
		30 days and less.	31 days to 60.	61 days to 90.	91 days to 120.	121 days to 150.	151 days to 180.	181 days to 210.	211 days to 240.	241 days to 270.	271 days to 300.	301 days to 330.	331 days to 360.	Not re- ported.
United States.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Food and kindred products.....	21.2	37.4	32.8	26.2	18.4	18.1	23.8	24.2	23.9	19.6	15.4	22.6	53.0	7.9
Textiles.....	7.9	2.3	2.1	2.3	2.6	3.6	4.2	5.1	8.0	10.8	11.7	7.2	0.8	3.8
Iron and steel and their products.....	6.6	1.8	1.7	2.7	2.4	2.8	3.3	3.3	4.9	6.0	8.0	8.1	2.4	2.9
Lumber and its remanufactures.....	15.1	28.4	34.7	34.0	36.8	34.7	27.0	28.8	26.6	23.1	12.6	7.1	2.0	0.5
Leather and its finished products.....	2.3	0.3	0.5	0.8	0.9	1.0	1.4	1.0	1.2	2.0	3.1	2.7	0.2	0.3
Paper and printing.....	14.2	1.9	2.4	3.3	3.5	3.1	3.7	3.7	3.3	4.2	14.2	22.0	6.0	63.1
Liquors and beverages.....	2.9	7.0	5.0	4.7	3.2	3.7	3.2	2.8	2.8	2.0	2.3	3.1	4.5	1.0
Chemicals and allied products.....	4.5	8.1	5.9	6.1	6.7	5.6	6.0	5.0	3.4	2.8	3.7	3.8	16.6	4.0
Clay, glass, and stone products.....	5.0	7.6	8.5	10.7	13.0	12.9	12.4	9.1	8.5	7.2	3.8	2.4	1.7	1.1
Metals and metal products, other than iron and steel.....	2.9	0.4	0.3	0.6	0.9	0.8	1.0	0.9	1.2	1.9	3.8	3.8	1.8	1.2
Tobacco.....	7.8	2.7	3.2	4.6	6.2	7.4	6.8	9.1	7.9	11.7	10.1	6.5	1.2	5.3
Vehicles for land transportation.....	3.4	0.2	0.5	0.8	0.7	0.7	0.8	0.8	1.4	1.7	3.8	4.8	5.5	0.7
Shipbuilding.....	0.5	0.1	0.1	0.3	0.8	0.6	0.7	0.7	0.6	0.7	0.7	0.3	(¹)	0.2
Miscellaneous industries.....	5.7	1.8	2.3	2.9	3.9	5.0	5.7	5.5	6.3	6.3	6.8	5.6	4.3	2.0

¹ Less than one-tenth of 1 per cent.

To interpret this table it is necessary also to refer to Table XLII, which contains the totals used in computing the percentages. It will be observed that the group of food and kindred products reported 45,790

establishments, or 21.2 per cent of the number reported for all industries, but contained 37.4 per cent of the 1,760 establishments that were in operation thirty days or less, and 32.8 per cent of the 4,559 that were in operation from thirty-one to sixty days. This group and "lumber and its remanufactures" reported the largest number of establishments, as shown by Table XLII, and therefore naturally in the majority of the classes show preponderating proportions in Table XLIV. The industries composing them are, however, in a number of cases, seasonal and show especially large percentages of establishments for the shorter periods of activity.

There are 12 states and territories in which more than 50 per cent of the establishments were in operation for more than 300 days during the year, and Table XLV shows the proportion of such establishments for each of these states.

TABLE XLV.—States having more than 50 per cent of establishments in operation for over 300 days: 1905.

STATE OR TERRITORY.	Total number of establishments.	Number in operation for over 300 days.	Per cent of total.
California.....	6,839	4,009	58.6
Colorado.....	1,606	904	56.3
District of Columbia.....	482	297	61.6
Montana.....	382	231	60.5
Nebraska.....	1,819	1,052	57.8
Nevada.....	115	70	60.7
New Jersey.....	7,010	3,529	50.3
North Dakota.....	507	286	56.4
Oklahoma.....	657	375	57.1
Rhode Island.....	1,617	945	58.4
South Dakota.....	686	385	56.1
Wyoming.....	169	87	51.5

This table shows that in three important manufacturing states—New Jersey, Rhode Island, and California—more than half of the establishments were in operation for more than 300 days during the census year. Of these three states, California shows the largest proportion, 58.6 per cent, for this maximum period of employment.

Of the 339 industries shown in Table 16, 12 reported 75 per cent or more of the establishments as in operation for more than 300 days during the census year. Table XLVI represents the figures for these industries.

TABLE XLVI.—Industries having 75 per cent or more of establishments in operation for over 300 days: 1905.

INDUSTRY.	Total number of establishments.	Number in operation for over 300 days.	Per cent of total.
Cars and general shop construction and repairs by steam railroad companies.....	1,141	961	84.2
Cars and general shop construction and repairs by street railroad companies.....	86	70	81.4
Cars, street railroad, not including operations of railroad companies.....	14	11	78.6
Condensed milk.....	81	67	82.7
Gas, illuminating and heating.....	1,019	928	91.1
Lard, refined.....	9	7	77.8
Oil, lard.....	5	4	80.0
Pulp, from fiber other than wood.....	1	1	100.0
Sand and emery paper and cloth.....	8	6	75.0
Smelting and refining, copper.....	40	30	75.0
Smelting and refining, zinc.....	31	24	77.4
Sulphuric, nitric, and mixed acids.....	32	24	75.0

It will be seen that the industries included in this table are for the most part those in which the processes are practically continuous. The demand for illuminating gas, for example, requires that the establishments should be in almost continuous operation, and 91.1 per cent were operated for over 300 days during the year.

There are only 2,467 establishments engaged in the industries included in this table. Although the number is not sufficient to indicate general conditions it illustrates the use of the figures. As there is but one establishment reported as engaged in the manufacture of pulp from fiber other than wood, the 100 per cent shown in the table for that industry has little significance.

Establishments in operation for a period of ninety days or less may be accepted as representing the other extreme of activity. There were 15 states in which 10 per cent or more of the establishments were in operation for this period and the totals for them are shown in Table XLVII.

TABLE XLVII.—States having 10 per cent or more of establishments in operation 90 days or less: 1905.

STATE OR TERRITORY.	Total number of establishments.	Number in operation 90 days or less.	Per cent of total.
Alabama.....	1,882	189	10.0
Arkansas.....	1,907	334	17.5
Delaware.....	631	81	12.8
Idaho.....	364	43	11.8
Kentucky.....	3,734	382	10.2
Louisiana.....	2,091	320	15.3
Maine.....	3,145	373	11.9
Maryland.....	3,852	455	11.8
Mississippi.....	1,520	160	10.5
North Carolina.....	3,272	372	11.4
South Carolina.....	1,399	190	13.6
Tennessee.....	3,175	424	13.4
Utah.....	606	71	11.7
Virginia.....	3,187	370	11.6
West Virginia.....	2,109	287	13.6

There were 32,874 establishments reported for these states and only 4,051, or 12.3 per cent, were in operation for the short period of ninety days or less. The number is so small that it can not be regarded as indicating any general tendency to a shorter period of activity in any of the states. The largest proportion—17.5 per cent—is shown for Arkansas and is due primarily to the inclusion of 67 establishments engaged in the canning of fruits and vegetables and 175 in the manufacture of lumber and timber products.

There were only 8 classifications of industry in which as many as 25 per cent of the establishments were in operation for ninety days or less. The totals for these industries are given in Table XLVIII.

Most of the industries covered by this table are those in which a considerable proportion of the establishments are operated during certain seasons of the year only. The largest proportion—79.1 per cent—is shown for the canning and preserving of fruits and vegetables. In many sections of the country the activity of establishments in this industry is limited to the few months in which the raw material can be obtained.

TABLE XLVIII.—*Industries having 25 per cent or more of establishments in operation 90 days or less: 1905.*

INDUSTRY.	Total number of establishments.	Number in operation 90 days or less.	Per cent of total.
Beet sugar.....	51	34	66.7
Canning and preserving, fruits and vegetables....	2,261	1,788	79.1
Liquors, distilled.....	805	260	32.3
Liquors, vinous.....	435	214	49.2
Oil, essential.....	52	25	48.1
Starch.....	131	93	71.0
Sugar and molasses, refining.....	344	261	75.9
Vinegar and cider.....	568	310	54.6

The manufacture of sugar and molasses shows the next largest proportion—75.9 per cent—of establishments in operation for the short period. About three-fourths of the establishments reported for this industry are located in Louisiana and their operations are confined to the comparatively short period that the sugar cane is in condition for use. The relatively small number of large sugar refineries that use the partially manufactured product as a material are, as a rule, in operation during the entire year.

CHAPTER VI.

MISCELLANEOUS EXPENSES, MATERIALS, AND PRODUCTS.

MISCELLANEOUS EXPENSES.

The amounts reported for miscellaneous expenses at the census of 1905 are summarized in Table XLIX.

TABLE XLIX.—*Miscellaneous expenses: 1905.*

	Amount.	Per cent of total.
Total.....	\$1,455,019,473	100.0
Amount paid for rent of factory or works.....	73,267,209	5.0
Amount paid for taxes, not including internal revenue.	58,697,616	4.0
Amount paid for rent of offices and buildings other than factory or works, and for interest, insurance, internal revenue tax, ordinary repairs of buildings and machinery, advertising, traveling expenses, and all other sundry expenses, not reported under the head of materials.....	1,177,732,132	81.0
Amount paid for contract work.....	145,322,616	10.0

The total amount reported as paid for miscellaneous expenses was \$1,455,019,473, as compared with \$905,600,225 for the census of 1900, an increase of \$549,419,248, or 60.7 per cent. From the uniformity with which manufacturers show larger expenditures for these items at the census of 1905, it is evident that the totals reflect actual conditions, but the large increase may be due in part to a slight change in the phraseology of the inquiry. The exact wording of the question as used at the census of 1905 is given in the above statement. The phraseology was the same at the census of 1900, with the exception that the word "factory" was not included in the first subquestion, and the last question but one was as follows: "Amount paid for rent of offices, and for interest, insurance, internal revenue tax and stamps, ordinary repairs of buildings and machinery, advertising, and all other sundries not reported under the head of materials." The instructions for the inquiry in 1900 directed that all items of expense incident to the business should be included that were not accounted for under other inquiries, but that commissions or expenses of the sales department should be excluded. The instructions for 1905, however, made no reference to the exclusion of the commissions or expenses of the sales department, as the value of product called for at both censuses was the value or price at the factory, and it was deemed proper that if the expenses of the sales department were included in such value they should also be reported as an expense. In addition to this, the inquiry of 1905

also specified traveling expenses as one of the items to be accounted for.

The inquiry derives its chief importance from the fact that it assists in the development of a full report from each establishment. Its presence aids in preventing the possibility of including under salaries, wages, or cost of materials any items that could not properly be reported as such. The answers are therefore of great service in arriving at a correct understanding of the individual reports and in their editing and preparation for tabulation. Their economic value, however, is questionable. They are of no assistance in making an accurate estimate of the profits of manufacture, because there are other expenses of which the Census takes no cognizance, and the value reported for products is not a value on which net or gross profits can be computed.¹

The first item represents an expenditure for the use of property which is devoted to manufactures, and which forms a part of the capital engaged in the industries, although its value is not included in the \$12,686,265,673, reported as capital. The \$58,697,616, reported as paid for taxes, includes all state, county, and municipal taxes, but does not include internal revenue taxes or customs duties. The third item is the largest of the group. The interest reported under this item depends upon the total amount of borrowed capital utilized during the entire year. The borrowed capital reported was only the amount at interest on December 31, 1904, or on the last day of the year covered by the report, and therefore has no definite relation to the amount of interest reported, which included all sums paid for interest during the year. In the industries subject to internal revenue tax the item is composed very largely of the amounts paid for such taxes. Some distillers reported no revenue tax because their products were sold in bond, the purchaser paying the tax; therefore the amount of tax reported has no definite relation to the value of products.

Table L shows the miscellaneous expenses, cost of materials, and value of products for some industries reporting a large expenditure for miscellaneous expenses, and may be of service in showing some of the items which compose miscellaneous expenses.

¹ See page xxxii.

MANUFACTURES.

TABLE L.—SELECTED INDUSTRIES REPORTING RELATIVELY LARGE MISCELLANEOUS EXPENSES: 1905.

INDUSTRY.	MISCELLANEOUS EXPENSES.					Cost of materials used.	Value of products, including custom work and repairing.
	Total.	Rent of works.	Taxes, not including internal revenue.	Rent of offices, interest, etc.	Contract work.		
Agricultural implements.....	\$15,178,008	\$81,113	\$714,836	\$14,248,729	\$133,420	\$48,281,406	\$112,007,344
Ammunition.....	2,903,030	12,827	50,434	2,878,769	21,000	10,000,929	19,930,821
Automobiles.....	3,946,309	88,497	77,025	2,745,601	1,034,640	11,058,138	26,045,064
Baking and yeast powders.....	4,942,076	61,207	50,838	4,761,320	69,245	8,940,076	19,042,521
Boxes, fancy and paper.....	3,114,408	807,758	94,318	2,106,710	15,673	16,085,826	36,866,580
Brick and tile.....	6,909,161	395,405	503,951	5,775,935	293,870	16,316,499	71,152,062
Canning and preserving, fish.....	3,082,771	60,565	152,106	1,649,537	1,220,503	15,885,354	26,377,210
Canning and preserving, fruits and vegetables.....	5,275,619	149,365	186,762	4,818,819	120,073	51,582,400	78,142,022
Cash registers and calculating machines.....	2,903,086	24,461	37,125	2,791,180	50,320	1,515,980	9,875,090
Cement.....	3,095,538	41,941	250,732	3,338,575	64,290	12,215,113	29,873,122
Clothing, men's.....	57,695,240	3,474,781	362,976	19,493,591	34,363,892	185,793,436	355,706,571
Clothing, women's.....	24,349,282	4,171,382	118,580	13,098,007	9,090,704	130,719,996	247,661,560
Collars and cuffs.....	2,927,740	55,883	17,772	1,780,189	1,073,902	4,030,842	12,587,277
Cutlery and edge tools.....	1,881,770	49,819	97,568	1,725,100	9,280	3,935,960	18,614,929
Druggists' preparations.....	5,891,047	215,183	136,882	5,534,261	5,321	13,419,635	31,782,250
Dyeing and finishing textiles.....	5,978,277	410,513	402,390	5,072,489	92,885	19,621,253	50,849,545
Electrical machinery, apparatus, and supplies.....	17,948,708	789,340	545,488	16,347,461	266,410	66,836,952	140,809,369
Firearms.....	1,128,677	7,149	50,353	1,018,681	43,494	1,738,012	8,275,560
Flavoring extracts.....	1,050,959	152,910	19,046	878,200	483	3,935,960	7,772,070
Food preparations.....	9,745,251	324,108	147,840	9,264,173	9,070	37,667,862	61,180,416
Foundry and machine shop products.....	70,235,452	3,665,670	3,407,447	58,930,375	4,163,060	278,074,203	685,901,388
Furniture.....	16,719,082	1,401,452	739,107	13,773,064	805,399	73,619,914	170,446,825
Gas, illuminating and heating.....	29,557,737	724,551	5,526,239	23,018,031	288,452	37,180,066	125,144,045
Glass.....	5,911,507	36,393	320,728	5,497,538	56,848	26,145,622	79,607,998
Hardware.....	5,045,210	218,013	236,005	4,352,099	239,093	16,631,214	45,770,171
Ice, manufactured.....	4,014,861	246,762	465,570	3,280,087	22,442	6,011,325	23,790,045
Liquors, distilled.....	95,524,151	70,518	292,264	95,141,686	19,083	25,625,858	131,269,886
Liquors, malt.....	119,462,138	311,734	3,211,392	115,904,471	334,541	74,911,619	298,358,732
Lithographing and engraving.....	3,348,560	529,586	90,612	2,402,556	325,806	8,340,823	25,245,266
Lumber and timber products.....	83,136,280	417,902	5,008,238	42,723,202	34,956,938	183,786,210	580,022,690
Marble and stone work.....	5,214,504	517,834	278,394	3,402,076	1,016,200	17,717,374	58,931,621
Mineral and soda waters.....	4,660,920	530,524	163,805	3,936,095	21,505	10,002,292	30,251,160
Musical instruments, pianos.....	5,532,420	409,570	192,692	4,575,063	294,189	19,587,770	40,922,471
Patent medicines and compounds.....	25,189,770	722,671	183,237	24,039,042	244,820	21,293,051	74,620,765
Pickles, preserves, and sauces.....	4,060,397	205,445	82,141	3,759,359	13,452	16,634,858	29,696,287
Pottery, terra cotta, and fire clay products.....	7,656,053	111,053	436,830	7,007,580	100,581	16,591,462	64,200,792
Printing and publishing, book and job.....	33,115,809	4,411,030	474,325	16,908,198	11,322,256	52,575,110	182,611,720
Printing and publishing, music.....	1,715,393	50,745	11,375	830,328	822,915	541,220	4,147,783
Printing and publishing, newspapers and periodicals.....	67,638,009	4,415,912	1,215,764	45,787,342	16,219,051	70,358,000	309,327,609
Shirts.....	6,451,006	594,663	55,077	2,704,939	3,036,327	25,639,402	50,971,105
Silk and silk goods.....	14,052,777	702,550	337,784	6,152,857	6,859,586	75,861,188	133,288,072
Silversmithing and silverware.....	2,478,873	145,552	63,363	2,261,327	8,631	9,010,086	20,700,703
Soap.....	10,226,146	135,620	227,810	9,784,212	28,504	43,625,608	68,274,700
Tobacco, chewing and smoking, and snuff.....	38,553,794	157,182	281,961	38,083,259	31,392	44,954,047	116,707,630
Tobacco, cigars and cigarettes.....	41,591,222	2,555,016	333,008	38,470,209	232,809	81,134,561	214,350,051
Varnishes.....	3,595,970	64,191	79,121	3,397,165	55,493	13,520,401	23,561,699

It will be observed that the amount paid for contract work is especially large in the manufacture of men's and women's clothing. This amount represents the sum paid by the manufacturers for the sewing or other work performed on the garments by workmen other than those regularly carried on their pay rolls. A considerable proportion of the work on the products of the two allied industries, the manufacture of collars and cuffs and the manufacture of shirts, is also done by wage-earners working elsewhere than at the factory, either under contractors or independently.

In the manufacture of silk and silk goods the large amount reported under contract work was paid for throwing and dyeing and finishing. The statistics for the several branches of this industry are shown separately in the special report on textiles in Part III, reference to which should be made for the figures for this item in the respective branches. The throwing branch of the silk industry is an important feature of the manufacture, and large sums are paid by manufacturers for this class of work when it is done by inde-

pendent operators. A large proportion of the dyeing and finishing is likewise done in independent establishments and the amount paid for it reported as paid for contract work.

The large amount reported under contract work in the lumber and timber industry represents for the most part contract payments for logging operations. For printing and publishing, book and job, the amount represents almost wholly the sums paid by book publishers for printing and binding. Moreover, little printing of music is done by the publishing house, so that the amount paid for contract work in this industry is likewise proportionately large. For newspapers and periodicals, also, the expense for contract work represents the amounts paid by publishers for printing as well as for engraving, electrotyping, etc.

As reports were also secured from independent contractors, which show the number of wage-earners and the amount paid in wages, a large portion of this item of expenditure is duplicated in the aggregate of the wages reported by all establishments.

In the manufacture of patent medicines and compounds and of food preparations, especially the former, the large amount of miscellaneous expense is due to advertising, which often amounted to more than the actual cost of manufacturing; and in the manufacture of tobacco and liquors the miscellaneous expenses consist largely of payments for internal revenue taxes. In "gas, illuminating and heating," a large amount is reported under taxes. This sum includes all taxes paid by the gas companies, whether to the city, county, or state, as well as franchise taxes, if any. The bulk of the miscellaneous expenses, however, is concentrated in the item of sundries. As constant repairs are necessary for the maintenance of the mains, and as the outlays for these are not entirely included under the items of labor and cost of materials in the schedule, it is probable that some part of the expenses was reported under sundries.

In the manufacture of lumber and timber products, relatively little was paid for rent of offices and buildings, advertising, traveling expenses, and other sundries, and none for internal revenue taxes. The expenses for repairs were confined in the main to those for machinery and were considerable. The amounts paid for insurance and interest, however, constituted by far the major part of the total. The insurance rate on lumber products stacked in the yard is very high, almost prohibitive under certain conditions, and in fact many establishments are often unable to secure insurance at any cost, owing to the highly inflammable character of the risk. The item of interest is also large, as lumber manufacturers are not infrequently forced to carry the output of their mills for several weeks or even months in order to avoid disposing of it at a loss, which necessitates borrowing money to stock and operate the plant in the meantime.

MATERIALS.

The inquiry concerning materials called for the cost and, whenever possible, the segregation of the materials consumed during the year in the manufacture of the product reported. In addition to covering materials which were components of the product, the inquiry included those essential to production by machinery, such as fuel, oil, and waste, and also articles necessary for the conveyance of the product to the consumer, such as packing boxes, and stock from which to make them, wrapping paper, and other supplies of a like nature. Usually the cost of materials included freight charges when paid by the manufacturer. Many establishments, however, kept separate freight accounts, and it was impossible to charge the amount paid for freight to each class of materials. In such cases the amount reported as paid for freight was entered separately under materials. In a large number of establishments materials purchased during the year were consumed for the most part during the same period, and costs could be readily reported; but in some cases large quantities of materials were purchased and only a portion consumed during the cen-

sus year, the remainder being kept in stock for use at a subsequent date. When this condition was encountered it was difficult to ascertain the cost of the quantities actually consumed; but fairly accurate results were obtained by deducting the value of the stock of material on hand at the end of the year, which was entered upon the schedule as an item of capital, from the cost of the total purchased during the year, and the remainder, plus the value of the stock on hand at the beginning of the year, was returned as the cost of the materials consumed.

In some instances a number of mills were operated by the same owner and the products of one were used as the materials in another. A familiar example of this mode of operation is that of the blast furnace and steel works conducted under the same management, the pig iron, the product of the blast furnace, being consumed as material in the steel mill. It was sometimes contended that, as the pig iron was not made for sale as such, it had no market value, so that no cost could be reported for the material of the steel mill. In such cases the cost of production of the pig iron or its estimated commercial value was entered as the cost of materials for the steel works.

Materials fall naturally into two general classes—first, those which are components of or necessarily accompany the products; and, second, those which are essential adjuncts to production. In the first class are distinguished materials consumed (1) in a raw state, and (2) in a partially manufactured form; and under the second appear (1) fuel, (2) mill supplies, (3) rent of power and heat, which is considered an expense in lieu of fuel, and (4) freight, when reported separately, as explained in the foregoing paragraph.

Strictly speaking, freight does not belong wholly to either of the two principal classes, as a portion of the amount reported may have been paid upon the materials of the first class, and the rest upon fuel, mill supplies, etc., which comprise the second. In default of any method of distributing accurately to each class of materials the amount paid for freight, the whole has been thrown under the second general class.

The cost of the two classes of materials for 1900 and 1905 is compared in Table LI.

TABLE LI.—Comparative summary, cost of materials: 1905 and 1900.

CLASS.	1905		1900		Per cent of increase.
	Cost.	Per cent of total.	Cost.	Per cent of total.	
Total.....	\$8,503,949,756	100.0	\$6,677,614,074	100.0	20.3
Class 1.....	8,058,747,369	94.8	6,197,457,736	94.2	30.0
Raw.....	3,141,134,590	37.0	2,306,748,484	35.1	36.2
Partially manufactured.....	4,917,612,779	57.8	3,890,709,302	59.1	26.4
Class 2.....	445,202,387	5.2	380,156,338	5.8	17.1
Fuel.....	307,895,376	3.6	196,964,213	3.0	56.3
Mill supplies, oil, waste, etc.....	63,328,921	0.7	76,744,330	1.2	117.5
Freight.....	56,836,057	0.7	96,230,996	1.5	140.9
Rent of power and heat.....	17,142,033	0.2	10,216,799	0.1	67.8

! Decrease.

MANUFACTURES.

The cost of all materials reported for the census of 1905 was an increase of \$1,926,335,682, or 29.3 per cent, over the cost reported at the census of 1900. The largest contribution to the increase was made in the item of partially manufactured materials, which shows a gain of \$1,026,903,477. At both censuses the largest expenditure was for this class of materials, which constituted 59.1 per cent of the total cost of all materials in 1900 and 57.8 per cent in 1905.

The materials of Class 1, as shown in the above table, formed practically the same proportion of the total cost of all materials at both censuses, approximately 94 per cent; but the proportion that the raw and the partially manufactured materials formed of the total for the class changed from 37.2 and 62.8 per cent, respectively, at the census of 1900 to 39 and 61 per cent at the census of 1905. This increased proportion of raw materials is due probably to the tendency among manufacturers as a whole to purchase raw materials and pass them through all the processes of manufacture, producing a finished article ready for final consumption, rather than to produce partially manufactured materials to be sold to another for further treatment.

Raw materials.—The materials used in the raw state consist principally of agricultural and mineral products, such as ore, raw hides, cotton, grain, wool, live stock, timber, etc., and comprised 37 per cent of the total expenditure for materials in 1905. The amount expended in the purchase of materials of this character, reported at the census of 1905, exceeded the amount for 1900 by \$834,386,156, or 36.2 per cent.

The materials classed as raw were confined to those which had not been treated previously by any establishment included in the census of 1905. This rule did not exclude materials which had already passed through certain elementary processes, as, for example, ginned cotton, shelled corn, thrashed wheat, and concentrates from the mine. The products of these processes are so slightly altered from their original forms that the Bureau of the Census still considered them as agricultural or mining products and classified them as raw materials.

Raw materials form the basis for all manufactures, and each process carries these materials to a higher stage of development, until finally the finished product is evolved. It is therefore instructive to determine the sources from which the manufacturing industries of the country draw the largest supplies of raw materials. These are fairly indicated in Table LII—a comparative table which shows the cost of materials derived from the farm, forest, mine, and sea, respectively, at the last two censuses, distributed according to the generic groups of manufactures in which they were consumed.

TABLE LII.—Cost of raw materials, distributed according to sources and groups of industries: 1905 and 1900.

SOURCE OF RAW MATERIALS.	1905		1900	
	Cost.	Per cent of total.	Cost.	Per cent of total.
All sources.....	\$3,141,134,590	100.0	\$2,306,748,434	100.0
Farm.....	2,492,836,646	79.4	1,873,509,091	81.2
Forest.....	103,464,677	5.2	115,971,265	5.0
Mine.....	471,118,181	15.0	307,900,308	13.4
Sea.....	13,715,086	0.4	9,367,770	0.4
Farm.....	2,492,836,646	100.0	1,873,509,091	100.0
Food and kindred products.....	1,586,193,096	63.6	1,219,364,065	65.1
Textiles.....	402,732,061	18.6	313,130,347	16.7
Leather and its finished products.....	159,474,130	6.4	134,798,979	7.2
Liquors and beverages.....	50,289,108	2.4	36,896,350	2.0
Chemicals and allied products.....	96,439,620	3.9	74,915,690	4.0
Tobacco.....	109,638,263	4.0	72,817,049	3.9
Miscellaneous industries.....	28,039,428	1.1	21,587,611	1.1
Forest.....	103,464,677	100.0	115,971,265	100.0
Lumber and its remanufactures.....	87,906,611	53.8	63,682,690	54.9
Paper and printing.....	25,403,882	15.6	11,396,844	9.8
Chemicals and allied products.....	8,200,186	5.0	7,494,243	6.5
Vehicles for land transportation.....	2,669,765	1.6	1,297,072	1.1
Shipbuilding.....	6,026	(¹)	.....	.....
Miscellaneous industries.....	30,219,207	24.0	32,100,416	27.7
Mine.....	471,118,181	100.0	307,900,308	100.0
Iron and steel and their products.....	112,590,155	23.9	74,781,646	24.3
Liquors and beverages.....	107,678	(¹)	339,489	0.1
Chemicals and allied products.....	159,406,029	33.9	90,774,893	29.5
Clay, glass, and stone products.....	25,102,739	5.3	17,208,289	5.6
Metals and metal products, other than iron and steel.....	140,333,882	29.8	98,731,527	32.1
Vehicles for land transportation.....	157,577	(¹)	45,730	(¹)
Miscellaneous industries.....	33,360,121	7.1	26,018,734	8.4
Sea.....	13,715,086	100.0	9,367,770	100.0
Food and kindred products.....	11,491,160	83.1	8,037,262	85.8
Chemicals and allied products.....	253,895	1.9	.....	.....
Miscellaneous industries.....	2,060,031	15.0	1,330,508	14.2

¹ Less than one-tenth of 1 per cent.

The figures for both censuses show that, from the standpoint of cost, farm products constituted the most important source of raw materials for the manufacturing industries of the country. At the census of 1900 the products of the farm and the ranch formed 81.2 per cent, and at that of 1905, 79.4 per cent, of the total amount paid by the manufacturer to the first producer of all materials consumed in the raw state. Of the 14 groups of manufactures, that of food and kindred products shows the largest total amount, \$1,597,594,256, as expended for the purchase of raw materials. Of this total, \$1,586,193,096, or 99.3 per cent, was paid for materials obtained from the farm or the ranch.

Next to food the manufacture of textiles consumed the largest quantities of farm products. In addition to other raw materials these industries reported the consumption of 1,981,804,446 pounds of cotton and 501,468,203 pounds of wool during the census year 1904. The cost of these fibers amounted to \$360,575,571, and formed 77.9 per cent of all raw material consumed in the textile manufactures. The proportion of raw materials obtained from the farm and consumed in

the manufacture of food and kindred products shows a slight decrease since 1900, while the proportion consumed in the textile industries has increased. The raw materials obtained from the farm and consumed in the miscellaneous industries of this group consist principally of straw and kindred substances used in the manufacture of hats and brooms, and of fur, hair, and feathers consumed in the manufacture of clothing, mattresses, etc.

The mine ranks next to the farm as a producer of raw materials for manufactures. At the census of 1900 the mineral products formed 13.4 per cent and at that of 1905, 15 per cent of the total cost of all raw materials. The manufacture of iron and steel and of other classes of metals and their products consumed 53.7 per cent of the raw materials reported at the census of 1905 as obtained from the mine. A slightly larger proportion, 56.4 per cent, was reported for these products at the census of 1900. The minerals consumed as raw materials in the manufacture of chemicals and allied products consist principally of crude petroleum, phosphate rock, nitrate of soda, pyrites, and sulphur, also coal used in the manufacture of gas. The percentages given in Table LII indicate a proportionate increase in these materials. The cost of coal consumed in the manufacture of coke is the principal item of materials from this source consumed in the group of the miscellaneous industries.

Establishments engaged in the manufacture of clay, glass, and stone products which obtained raw materials from their own clay beds or quarries did not report the cost of such materials, because the expense was covered in the wage account. This accounts in part for the comparatively small proportion of raw materials, 5.3 per cent, reported for this group.

The forest ranks third as a source of raw material for manufactures, supplying about the same proportion, 5 per cent approximately, at the censuses of 1900 and 1905. The lumber and pulp mills and timber camps are the largest consumers of forest products. The stumpage value of the timber consumed was reported as the cost of the raw materials for the lumber mills and timber camps, and amounted to \$75,909,937, or 46.4 per cent of the total value of raw material obtained from the forest reported at the census of 1905. The cutting of wood for use in pulp mills is not included in the census of manufactures. The wood consumed in this manner is considered a raw material, and at the census of 1905 amounted in value to \$20,800,871.

Fish and oysters constituted by far the largest proportion of the raw materials obtained from the sea, though the value of shells used in the manufacture of buttons was considerable.

Partially manufactured materials.—These materials range from products such as pig iron and timber removed from the raw state by only one process to

more highly finished articles, like cloth and tempered steel. This class includes both materials which are essential constituents of the product and those which are necessary to the packing and shipping of the articles produced. In several industries the latter item comprised nearly the entire cost of the partially manufactured products consumed. Some notable examples are shown in Table LIII.

TABLE LIII.—Cost of articles employed in packing and shipping the product, with per cent of total cost for all partially manufactured materials, for selected industries: 1905.

INDUSTRY.	Cost of all partially manufactured materials.	BOXES, BARRELS, CARTONS, SACKS, ETC.	
		Amount.	Per cent of all partially manufactured materials.
Butter.....	\$3,384,460	\$3,006,027	88.8
Cheese.....	1,123,372	1,123,342	100.0
Condensed milk.....	7,152,880	3,842,275	53.7
Flour and grist mill products.....	24,550,721	22,065,407	93.5
Petroleum refining.....	25,743,150	17,870,348	69.4
Salt.....	12,585,280	12,364,550	91.5

¹ Does not include cartons.

The total amount expended for partially manufactured materials exceeded the cost of the raw materials by \$1,776,478,189. This excess is due to some extent to duplications, the nature of which will be discussed under "products."

Relation of materials to products.—In general, it may be stated that the proportion which the cost of materials forms of the value of products indicates the measure of productive force expended upon the materials of any industry. There is such a marked difference in this regard that a grouping of the industries based upon the relation of materials to products is not only instructive but essential to a proper comprehension of the significance of statistics of manufactures. Accordingly three groups will be distinguished among which the industries included in the census of 1905 may be distributed, as follows:¹

1. Industries in which the cost of materials formed a smaller percentage of the value of products than did the cost of labor, the increased value of products over materials being in most cases largely attributable to the cost of labor. In the majority of the industries in this class, the nature of the products required the labor of especially trained men whose skill was supplemented in many cases by scientific or artistic ability of a high order. Accordingly the supply of labor was limited and the reward high, with the result that the value of the product was enhanced more by the cost of labor than by any other element.

2. Industries in which the cost of materials formed an important but not an overwhelming element in the value of the products. In most of the industries of

¹Tenth Census, Manufactures, folio 12. This grouping follows that of Superintendent Francis A. Walker.

this class the cost of materials exceeded largely the cost of labor. The most prominent characteristic is the general use of machinery, the development of which has resulted in a uniformity and volume of production impossible to attain by human power. In this group fall the great body of factory industries, whose products constitute the most important contributions to the real manufacturing output of the country.

3. Industries in which the cost of materials formed a far greater proportion of the value of products than all the other elements combined. In the industries of this group the slight value added to the raw materials by manufacturing operations indicates clearly the elementary character of the processes employed.

Important industries in each class are presented in Table LIV.

TABLE LIV.—COMPARISON OF WAGES AND COST OF MATERIALS, WITH GROSS AND NET VALUE OF PRODUCTS, FOR SELECTED INDUSTRIES: 1905.

INDUSTRY.	Total wages.	COST OF MATERIALS.				VALUE OF PRODUCTS.	
		Total.	Purchased in raw state.	Purchased in partially manufactured form (including "all other materials" and "mill supplies").	Fuel, freight, and rent of power and heat.	Gross.	Net. ¹
Group I.....	\$101,803,655	\$71,350,073	\$15,008,794	\$39,228,372	\$17,022,907	\$242,970,007	\$203,750,635
Glass.....	37,288,148	26,145,522	.....	10,309,758	6,775,764	79,607,998	60,238,240
Firearms.....	3,722,850	1,738,012	6,000	1,573,078	153,934	8,275,500	6,702,482
Marble and stone work.....	23,629,867	17,717,374	9,100,091	6,355,663	2,225,620	58,931,021	52,545,958
Stereotyping and electrotyping.....	1,993,067	1,032,053	.....	914,132	117,921	5,005,338	4,091,206
Pottery, terra cotta, and fire clay products.....	25,177,665	16,591,462	5,858,663	3,642,867	7,089,932	64,200,792	60,557,025
Cutlery and edge tools.....	7,076,018	6,028,166	122,629	5,306,509	508,038	18,614,629	13,218,330
Electroplating.....	1,092,835	747,331	480	666,150	80,701	2,965,014	2,208,864
Instruments, professional and scientific.....	1,823,205	1,350,153	4,931	1,280,125	65,097	5,377,755	4,097,630
Group II.....	368,075,864	1,309,283,954	496,168,123	753,909,777	59,206,054	1,907,086,308	1,243,176,621
Boots and shoes.....	69,059,680	197,363,495	.....	194,940,205	2,423,290	320,107,458	125,107,253
Cotton goods.....	94,377,696	282,047,648	221,821,944	49,108,232	11,117,472	442,451,218	309,342,986
Woolen goods.....	28,827,556	87,830,825	47,875,088	36,320,398	3,635,330	142,190,658	105,876,026
Iron and steel, steel works and rolling mills.....	122,491,993	441,204,432	2,716,777	402,574,794	35,912,861	673,065,026	271,390,232
Worsted goods.....	26,209,787	109,658,481	64,958,627	41,945,722	2,754,132	165,745,052	128,799,530
Leather, tanned, curried, and finished.....	27,049,152	191,170,073	158,795,687	29,020,426	3,362,960	252,620,980	223,600,500
Group III.....	73,320,592	1,709,434,671	1,290,743,577	387,477,091	31,214,003	1,960,121,682	1,572,644,501
Slaughtering and meat packing, wholesale.....	37,090,399	706,230,069	580,471,507	120,046,695	5,711,867	801,757,137	681,710,442
Smelting and refining, copper.....	10,827,043	196,736,986	63,651,337	121,112,890	11,972,769	240,780,216	119,667,326
Smelting and refining, lead.....	5,374,091	168,958,076	61,335,302	103,597,154	4,025,620	185,826,830	82,229,685
Flour and grist mill products.....	19,822,196	619,971,161	585,065,067	25,460,480	9,445,614	713,033,305	687,572,915
Gold and silver, reducing and refining, not from the ore.....	206,263	17,538,379	220,364	17,250,872	58,143	18,724,005	1,464,223

¹ See page cviii for explanation of method of ascertaining the net value of products.

In considering Table LIV it should be understood that in several of the industries establishments will be found in which the methods of manufacture will prove exceptions to the general rule which governs the whole industry and caused its assignment to the group in which it appears. For example, there are a number of establishments in the industry "cutlery and edge tools" assigned to Group I which, if segregated, by virtue of characteristics similar to those marking Group II would appear with the industries of that group. In such establishments the cost of materials far exceeded the cost of the labor, and, as a result, the establishments rightfully belong to Group II rather than to Group I. Such exceptions will be found in nearly every industry. The grouping must therefore be understood to reflect merely a predominant characteristic of the industries selected, and not a rigid law of production which admits of no exceptions within the industries.

The totals for the three groups of industries indicate the character of the industries included in each. That labor is the chief element of cost in the industries of

Group I is shown by the excess of wages over cost of materials, while the reverse is true of Group II and, to a much more pronounced degree, of Group III.

The amount paid in wages in all of the industries included in Group I represented more than 33 per cent of the gross value of products, the proportion going as high as 46.8 per cent in the manufacture of glass. In no instance does the cost of materials form as large a proportion of value of products. A considerable proportion of the materials reported for "marble and stone work" was purchased in the raw state, and the expense for fuel represents a large proportion of the total cost of materials for "pottery, terra cotta, and fire clay products." With these exceptions, the larger proportion of the materials for all of the industries was purchased in a partially manufactured form, and labor was an important factor in its manipulation, so that the amount paid for labor in all of the industries forms in reality an even larger percentage of the cost of production than is indicated by the figures given in this table.

The industries selected for Group II illustrate the

fact that the general employment of machinery reduces the proportion of the total cost of production which is assigned to labor. In these industries the cost of materials was in excess of the amounts paid as wages, and a large proportion of the materials was purchased in the raw state.

The use of machinery and the comparatively simple processes applied in the industries included in Group III reduce the proportion of labor cost to the minimum and increase the amount paid for materials. The comparatively large amount of partially manufactured material reported for copper and lead smelting and refining is due to the fact that the bullion product of the smelters forms the chief material of the refinery. Therefore there is not only a large duplication, but the gold and silver values associated with the copper and lead also give great value to the materials for both industries. The material for gold and silver reducing and refining, not from the ore, consists chiefly of the sweepings and scraps of jewelry manufacturers, which have a high value.

The ratio of the cost of the raw and the partially manufactured materials to the cost of all materials in any group is indicative of the value to manufactures of the raw materials which are consumed by the industries which compose the group. When materials consumed in the raw state go through only one establishment and emerge a finished product which is perishable or whose usefulness is confined to one channel of consumption, it seldom becomes the material for further processes and therefore does not reappear as a partially manufactured material. A large proportion of the raw material derived from the farm is of this nature. On the other hand, when the raw materials of a group of industries are capable of being manufactured into products which are varied and adaptable to many uses, the products of the factory through which the raw materials first pass become the basic material for many industries. Thus in the form of partially manufactured materials the value of the raw materials increases and is duplicated as the processes multiply, until finally their original cost forms a comparatively small percentage of the cost of all materials. Industries deriving their raw material from the mine present this characteristic most markedly.

The ratios of the cost of the raw and of the partially manufactured materials to the cost of all materials in the 14 great groups of industries for 1905, presented in Table LV, bring out the significance of the relation as it exists in each group.

In the food and kindred products group, raw materials formed 69.3 per cent and partially manufactured materials, 28.9 per cent of the total cost of all materials. This was due to the fact that the products of the group were foodstuffs, the preparation of which from the raw material necessitated, for the most part, but one continuous process. The manufacturing operations, there-

fore, were generally confined to one factory, from which the products were distributed through the regular channels to the final consumer, so that the raw materials did not form the basis for extensive manufacturing. In the group "iron and steel and their products," on the other hand, the cost of the partially manufactured materials was 78.3 per cent of the cost of all materials, while the raw materials constituted only 9.5 per cent of the entire expenditure. In this group the fundamental raw material is iron ore, and the iron and steel manufactured therefrom is the basic material for the 36 industries composing the group. It follows, therefore, that the immense cost of the partially manufactured materials is due in large part to the increased value added to the raw material by manufacturing processes.

TABLE LV.—*Per cent which cost of raw and of partially manufactured materials forms of total cost of materials, by groups of industries: 1905.*

GROUP.	PER CENT OF TOTAL COST OF MATERIALS.	
	Raw.	Partially manufactured.
United States.....	36.9	57.8
Food and kindred products.....	69.3	28.9
Textiles.....	37.1	59.1
Iron and steel and their products.....	9.5	78.3
Lumber and its remanufactures.....	17.0	78.0
Leather and its finished products.....	33.9	64.5
Paper and printing.....	8.2	83.3
Liquors and beverages.....	42.5	48.8
Chemicals and allied products.....	43.4	51.7
Clay, glass, and stone products.....	20.4	43.7
Metals and metal products, other than iron and steel.....	21.8	74.0
Tobacco.....	79.8	19.0
Vehicles for land transportation.....	0.8	94.6
Shipbuilding.....	(¹)	95.5
Miscellaneous industries.....	22.3	73.0

¹ Less than one-tenth of 1 per cent.

PRODUCTS.

The unit of measurement.—The Census enumerates all classes and varieties of products manufactured during the census year, and, in addition, includes the amounts received by manufacturers for work done for others who furnish and retain the ownership of the material. Because of the almost infinite number and endless variety of manufactured products the only practicable standard for measurement and comparison is value as measured by money, and the accepted unit of this standard is the dollar. But the dollar is not entirely satisfactory, because it has not always represented the same value, and from census to census seldom stands for the same quantity. It does, however, furnish the only comparative term applicable to all products during a census year. In 1873 the United States adopted the gold dollar as the only unit of value. When the census of 1870 was taken, however, the paper dollar was the standard, with an average value of 79.81 cents in gold. The result was an inflated value for this census as compared with subsequent censuses, but omissions in returns which then occurred

have had the effect of offsetting the inflation to a great extent, so that for general comparative purposes the 1870 totals have been allowed to stand without any attempt to reduce the values to the gold basis.

The quantity of a given article which will exchange for a dollar may vary widely at different periods. As a result of improvements in methods of producing raw material and in means of transportation, and of increased production made possible by new machinery and improved processes, the natural price of manufactured products, which is governed essentially by the cost of production, is constantly tending to decrease. Other causes of changing prices which exercise only a temporary effect are good or bad harvests, the changing requirements of fashion, impost and excise duties, speculative manipulation of markets, disputes between labor and capital, and combination of producers for control of prices. It follows that the dollar may represent a greater quantity of manufactured goods at one census than at another, and thus quantitative increases in the manufactured output of the country from census to census are not fully reflected by this unit of measure. This is indicated by Table LVI, which, with the exception of the totals for wire nails, was shown in the report of 1900 for a similar purpose, and has now been extended so as to include the statistics for 1905.

TABLE LVI.—Quantity and value of certain products: 1905, 1900, and 1890.

CLASS.	Census.	Unit of quantity.	Quantity.	Value.	Average value per unit of quantity.	PER CENT OF INCREASE.	
						Quantity.	Value.
Pig iron.....	1905	Tons ¹	16,623,625	\$228,911,116	\$13.77	15.1	10.8
	1900	Tons ¹	² 14,447,791	206,512,755	14.29	63.3	41.8
	1890	Tons ¹	³ 8,845,185	145,612,983	16.46	.....	.....
Steel rails.....	1905	Tons ¹	2,193,705	58,236,050	26.55	+2.5	25.2
	1900	Tons ¹	2,250,457	46,501,979	20.66	21.4	+22.8
	1890	Tons ¹	1,853,862	60,272,575	32.51	.....	.....
Cut nails	1905	Kegs ⁴	1,311,549	2,394,108	1.83	+20.9	+27.3
	1900	Kegs ⁴	1,658,443	3,292,063	1.99	+71.7	+73.3
	1890	Kegs ⁴	5,857,030	12,333,603	2.11	.....	.....
Wire nails ..	1905	Kegs ⁵	9,061,512	17,495,362	1.93	96.9	40.6
	1900	Kegs ⁵	4,603,010	12,445,096	2.70	302.7	.....
	1890	Kegs ⁵	1,142,927	(⁶)	.....	.....	.....

¹ 2,240 pounds to a ton.

² Not including 1 penal establishment having a product of 4,443 tons valued at \$66,645.

³ Including 1 penal establishment.

⁴ Decrease.

⁵ Kegs of 100 pounds.

⁶ Not reported separately.

The average value per ton given in this table does not represent the price at the point of consumption, but is the average value at the works. The striking facts of the table are the decreases in the price per ton of pig iron and per keg for wire nails, and the increase in the price for steel rails, all of which changes are reflected in the percentages of increase in the total quantities and values. The quantity of pig iron and of both wire and cut nails represented by the

dollar's worth of product has increased, while the quantity of steel rails represented by the same unit of value has decreased. The comparisons between 1890 and 1900 indicate a more decided increase in the quantity represented by a dollar's worth of product than that from 1900 to 1905.

The conditions, however, with respect to the steel rail industry have been such as to make conclusions deduced from a comparison of the average values, as shown by the census returns, very misleading. The census of 1900 covered in general the period from June 1, 1899, to May 31, 1900. During the years 1897 and 1898 the average prices of Bessemer steel rails at the mills in Pennsylvania were the lowest ever known, the average for the year 1898 being \$17.62 per ton. During the year 1899 prices advanced rapidly from an average price of \$18.50 per ton in January to \$35 in December, but many mills were tied up by contracts made during the period of low prices, and hence the average price per ton, as shown by the census of 1900, was abnormally low as compared with the then prevailing prices. The average price of Bessemer steel rails at the mills in Pennsylvania for the year 1899, as given by the reports of the American Iron and Steel Association, was \$28.12, which figure is in line with the general trend of values for pig iron and the other leading products at the several censuses.

At several censuses special schedules have been prepared for certain important industries, which have called for quantity as well as value. In such cases comparisons of quantity are often instructive, but even here comparison may be misleading unless the goods compared are practically similar in grade and quality. Thus even when fixed units of measurement like the ton, yard, or dozen are available, the changes which are continually taking place in the industrial world in methods of production and grade of goods produced stand in the way of accurate quantitative comparisons. These changes affect in varying degrees the accuracy of all attempts at such comparisons between censuses. In the case of pig iron, for example, there are various grades, such as Bessemer, foundry, number two, etc., which are quoted at different prices. In making comparisons it should be remembered that the proportions of the different kinds manufactured may have varied at the two census periods, so that the average value of pig iron may have been affected. For example, at the census of 1810 the production of pig iron in Pennsylvania was reported as 26,878½ tons, valued at \$1,301,343, an average of about \$50 per ton. If this value per ton was applied to the production of the state for the present census, which amounted to 7,729,278 tons, it would give a value of \$386,463,900, instead of \$107,395,757, the amount actually reported. But the values ranged in 1810 from a minimum of \$27 per ton to a maximum of \$100 per ton. Evidently in the absence of cheap

freights, the prices depended largely upon local conditions, which were entirely different from the conditions controlling prices at the census of 1905. It is impossible to refine the figures so as to show the effect of these various conditions or to eliminate all sources of possible error.

A similar difficulty is encountered in many other industries. The manufacture of agricultural implements, for example, is of such a character as absolutely to forbid any exact comparison of the operations of the industry as a whole at different censuses. In addition to the fact that many implements included under this classification are unavoidably mingled with the products of other establishments, such as machine shops, and are therefore omitted from the statistics of agricultural implements, the implements and machines of the same class frequently differ widely from time to time in cost of construction, and consequently in price to the purchaser.

Value of products.—The instruction for the inquiry concerning products was, in part, as follows: "Give the total value or price at the factory or works, and account for all products manufactured during the year, including by-products." The object of the inquiry was to obtain the value at the factory of the total production during the census year irrespective of the sales. When properly returned this value was composed of (1) items in the expenses of production that were ascertained by the Census Bureau, which were (a) the cost of supervision and clerical work, (b) the cost of labor, (c) miscellaneous expenses, including taxes, insurance, ordinary repairs, etc., and (d) the cost of materials; and (2) items not segregated by the Census Office, but which belong to the expenses of production, such as charges for the use of capital, the net profit of the manufacturer, depreciation on plant, etc. The difference between the ascertained expenses of production and the selling price at the factory, as returned upon the schedules, has often been carelessly used to show the gross profits of the manufacturer. This is an erroneous use of the figures, since the Census Bureau makes no attempt to obtain an accurate measure for this margin or to analyze the causes for its presence or absence in the figures.

Contained in the cost of all materials are the duplications which compose the cost of the partially manufactured materials. The extent of these duplications depends upon the amount of partially manufactured materials consumed during the year. If all establishments purchased raw material and produced finished products ready for final consumption, the statistics would contain no duplication of either materials or products. For instance, the paper and pulp mills report the

manufacture and sale of 780,706 tons of wood pulp and soda and sulphite fiber, which was purchased by other paper mills and reported as material, appearing again as a more highly finished product. If all paper mills purchased wood, manufactured their own pulp, and disposed of the finished product, paper, this source of duplication would be eliminated; the value of the paper, however, would be duplicated when reported by printing offices or in the manufacture of paper bags, boxes, or hangings. If the manufacturers of furniture purchased their lumber on the stump, the duplication that is incident to its passage through the timber camp and the lumber and planing mill, each of which reports it as material and again as product, would be eliminated. One of the objects in the formation of large establishments and of combinations of manufacturers is to take advantage of economies incident to the control of the source of raw material and to keep all of the various stages of production under the same ownership. The increase of large establishments of this character tends to eliminate the duplication in the gross value of products as reported by the Census. While this concentration of processes under the same ownership has been very pronounced in some industries, there is apparently no statistical method of determining the extent of its effect on the gross value of all products as compared with former censuses.

In some instances the amount of duplication depends upon the system of bookkeeping and the methods followed in the preparation of the Census reports. For instance, if a company engaged in the slaughtering and meat packing industry and also in the manufacture of fertilizers keeps separate account books for the two branches of industry which may be carried on in adjoining buildings, separate Census reports would probably be prepared, the report for fertilizers showing the cost of considerable quantities of material which were the products of the slaughtering plant; another establishment engaged in the same industries, but not keeping separate accounts for the manufacture of fertilizers, would make but a single report to the Census, accounting for the fertilizers as by-products of the slaughtering plant. An establishment may be conducted under the former conditions at one census and under the latter at a subsequent census; the statistics would therefore indicate a decrease in the cost of materials and value of products, but the decrease would be due to the method followed in preparing and compiling the data; and not to an actual change in the industry. The condition emphasizes the fact that the gross value of products is not a safe basis to determine the actual value of the manufactures of the country or of the increase or decrease in such products.

The nature of these duplications was fully discussed in the Twelfth Census Report on Manufactures,¹ in which the following hypothetical example was given:

1. The value of the yarn made in the yarn mill..... \$10,000
2. The value of the cloth made in the cloth mill (in which value is included the value—\$10,000—of the yarn which was bought and used as material)..... 15,000
3. The value of the clothing made in the clothing factory (in which value is included the value—\$15,000—of the cloth which was bought and used as material).... 20,000

Gross value of the products of the three establishments..... \$45,000

It is apparent that the value of the products of these three establishments is not \$45,000, but \$20,000, the value which would have been reported had these three operations been performed by one establishment, as is often the case.

The elimination of these duplications from the gross value of the products has been accomplished by two methods, and the result termed the "net value." The gross value has always been the sum of the value of all products reported, and for the censuses of 1870, 1880, and 1890 the net value adopted was the amount remaining after the cost of all materials had been deducted from the gross value. This resulted, however, in deducting the value of the raw materials, which properly belonged in the net value, for it is evident that by the elimination of the cost of all materials the net value of products was not obtained, since the essential element of the net value, namely, the cost of first materials, was lacking. To overcome this objection and permit a more scientific treatment of the results, the separation of materials into raw and partially manufactured was provided for upon the schedules for the censuses of 1900 and 1905. This made it possible to deduct the cost of the partially manufactured materials from the gross value of products, leaving a net value properly composed of the cost of the raw materials plus the value added to them by manufacturing processes.

This method has the merit of reaching results which approach much nearer to the actual net value of the manufactured products of the country than those obtained by the methods applied in former censuses, but it contains several defects which materially affect its accuracy. In the first place, the cost of the partially manufactured material includes the cost of imported materials consumed in manufactures. Since these materials had never appeared as products in this country, their original cost was not duplicated, so that their cost bears the same relation to the value of the product as does the cost of the raw material. The net value of product is, therefore, too small by an amount equal to the cost of these materials. The value of such wholly or partially manufactured materials imported for use in the manufacturing and mechanic arts during the year ending June 30, 1904, was \$156,054,122, duty

paid. These materials, to a very great extent, were probably reported by manufacturers as materials consumed and the amount may be added to the net value, which gives \$9,977,259,509 as the total net value of the products of manufactures.

Furthermore, the fact that the manufacturer reported upon the schedule a value for his products which is not as great as the final cost to the manufacturer who consumes them as materials, results in the deduction from the gross value of a sum greater than the duplication contained in the figures. This also reduces the net value below its true total.

The defects enumerated above impair the significance of the net value of products as an accurate measure of the final value of the manufactured output during the census year, but it affords the only possible measure obtainable for what it is intended to represent. It has the decided merit of establishing for future censuses a basis of comparison of far greater meaning and accuracy than had been devised previous to the Twelfth Census.

Relation of materials to rank of industries.—The most accurate indication of the importance of an industry, from the standpoint of manufactures, is found in the value which is added to the materials by manufacturing processes. This value may be obtained by deducting from the gross value of products, the cost of all raw and partially manufactured materials consumed, or by deducting from the net value the cost of raw materials and adding the cost of mill supplies. The value thus derived represents the amount added to the cost of materials by manufacturing processes, distributed principally in the form of wages to labor, miscellaneous expenses, charges for the use of capital, and profits to the manufacturer. Thus the greater the value added to the materials, whether raw or partially manufactured, by manufacturing processes, the greater the economic value of the industry to the country.

Furthermore, ranking the industries according to either the gross or net value of their products gives an undue prominence to some, the cost of whose crude material is proportionately much greater than is the case with others. Several industries when so ranked appear to be of the first importance, but when the cost of their materials is deducted from the gross value of their products, the margin of value added to them by manufacturing processes is shown to be so slight as to reveal clearly the relatively small importance of the industry to manufactures when weighed by economic standards.

This fact is illustrated in Table LVII, which shows the cost of materials, the gross and net value of products, and the value added to raw materials by manufacturing processes, for the United States, distributed according to the 14 great groups of industries.

¹ Twelfth Census, Manufactures, Part I, page cxi.

TABLE LVII.—GROSS AND NET VALUE OF PRODUCTS, AND VALUE ADDED TO MATERIALS BY MANUFACTURING PROCESSES, IN COMPARISON WITH THE COST OF MATERIALS, FOR FOURTEEN GENERIC GROUPS OF INDUSTRIES, WITH RANKS: 1905.

GROUP.	COST OF MATERIALS.				VALUE OF PRODUCTS.				VALUE ADDED TO MATERIALS BY MANUFACTURING PROCESSES. ¹	
	Total.	Purchased in partially manufactured form (including "all other materials" and "mill supplies").	Purchased in raw state.	Fuel, freight, and rent of power and heat.	Gross.		Net.		Rank.	Amount.
					Rank.	Amount.	Rank.	Amount.		
United States.....	\$8,503,949,756	\$4,980,941,700	\$3,141,134,500	\$381,873,406	.....	\$14,802,147,087	.....	\$9,821,205,387	.....	\$6,743,399,718
Food and kindred products.....	2,304,416,564	668,745,274	1,597,594,250	38,077,034	1	2,845,234,800	1	2,176,489,626	4	581,789,412
Iron and steel and their products....	1,179,381,468	937,249,453	112,500,155	130,141,850	2	2,176,739,726	3	1,239,490,273	1	1,140,528,721
Textiles.....	1,246,562,061	750,431,478	462,732,001	33,398,582	3	2,147,441,418	2	1,367,009,940	2	948,088,552
Lumber and its remanufactures.....	518,908,160	418,415,003	87,905,611	12,527,530	4	1,223,730,336	4	805,315,333	3	730,913,171
Chemicals and allied products.....	609,351,100	317,475,714	204,345,730	27,529,716	5	1,031,905,203	5	714,489,549	7	452,640,337
Miscellaneous industries.....	400,205,501	338,614,269	102,672,787	18,918,445	6	941,004,873	6	602,990,604	6	503,130,100
Metals and metal products other than iron and steel.....	644,367,583	479,349,757	140,333,882	24,683,944	7	922,262,456	8	442,912,099	11	305,090,486
Paper and printing.....	308,269,655	200,230,906	25,403,882	22,025,867	8	857,112,256	7	593,872,350	5	574,971,969
Leather and its finished products.....	471,112,921	304,730,056	159,474,130	6,902,735	9	705,747,470	10	401,011,414	12	242,209,606
Vehicles for land transportation.....	334,244,377	319,314,541	2,827,342	11,602,494	10	643,924,442	12	324,109,901	9	324,742,039
Liquors and beverages.....	139,854,147	69,531,397	59,447,785	10,874,964	11	501,266,005	9	431,735,208	8	373,530,068
Clay, glass, and stone products.....	123,124,392	56,259,365	25,102,739	41,702,288	12	391,230,422	11	334,971,057	10	312,308,532
Tobacco.....	126,088,608	24,017,506	100,638,263	1,432,839	13	331,117,081	13	307,100,175	13	208,517,442
Shulphur.....	37,493,179	36,061,981	6,026	1,305,172	14	82,769,239	14	46,707,238	14	46,991,223

¹ Obtained by deducting cost of raw materials from net value of products and adding amount expended for mill supplies.

Ranked according to the gross or net value of products, the group "food and kindred products" stood first, with an amount in the case of the net value almost a billion dollars greater than the net value of products of its nearest competitors—"textiles" and "iron and steel and their products." But that such an importance in manufactures as these figures seem to show did not actually belong to the food and kindred product group is indicated by the cost of crude materials, which constituted 73.4 per cent of the net value of products whereas in the two groups "textiles" and "iron and steel and their products," the cost of raw materials consumed comprised only 33.1 and 9.1 per cent, respectively, of the net value of their products. By adding the cost of mill supplies to and deducting the cost of the raw material from, the net value of products, the value added to them by manufacturing processes remains, and furnishes a reliable means of judging the relative importance of the great groups. Measured by this standard iron and steel and their products stood first, textiles second, lumber and its remanufactures third, food and kindred products fourth, and paper and printing fifth. The manufacture of iron and steel products contributed to the wealth of the country by manufacturing processes nearly twice as much as the industries included in the "food and kindred product" group. The importance of the "textile group" is also shown clearly and further illustrates the utility of a ranking by the value added to materials by manufacturing processes.

Next to food and kindred products the greatest difference in relative importance when ranked by the two methods is shown for the paper and printing industries and for the manufacture of vehicles for land transpor-

tation. Both of these groups consume relatively small amounts of raw material, and consequently one ranked two and the other three places higher in the value added by manufacturing processes than in the net value of products.

Table LVIII shows for the 10 leading manufacturing states totals similar to those given in Table LVII for the 14 groups of industries.

This table illustrates the fact that the combination of the statistics for a number of dissimilar industries, some consuming relatively large and others relatively small proportions of raw material, tends to equalize the differences in the relative ranking according to gross and net value of products and the value added by manufacturing processes. The first six states and the tenth have the same relative standing in all three methods of ranking. The manufactures of these states are so diversified that there is no industry in any of them which is of sufficient magnitude or in which either class of material is of sufficient importance relatively to change the rank. But this similarity in the relative importance of the different classes of material does not prevail to the same extent in Michigan, which ranked eighth in gross value of products, ninth in net value of products, and seventh in the amount added to materials by manufacturing processes. Although a few of the leading industries in Michigan consume large quantities of raw materials, so great a majority use large proportions of partially manufactured materials that the rank of the state in net value of products is reduced, while the rank in the value added to materials is advanced.¹

¹ For the impossibility of obtaining an accurate net value for states or industries, see Twelfth Census, Manufactures, Part I, pages cxli and cxlii.

MANUFACTURES.

TABLE LVIII.—GROSS AND NET VALUE OF PRODUCTS, AND VALUE ADDED TO MATERIALS BY MANUFACTURING PROCESSES, IN COMPARISON WITH THE COST OF MATERIALS, FOR TEN LEADING STATES, WITH RANKS: 1905.

STATE.	COST OF MATERIALS.				VALUE OF PRODUCTS.				VALUE ADDED TO MATERIALS BY MANUFACTURING PROCESSES. ¹	
	Total.	Purchased in partially manufactured form (including "all other materials" and "mill supplies").	Purchased in raw state.	Fuel, freight, and rent of power and heat.	Gross.		Net.		Rank.	Amount.
					Rank.	Amount.	Rank.	Amount.		
New York.....	\$1,348,603,286	\$992,556,091	\$316,339,284	\$39,707,911	1	\$2,488,345,579	1	\$1,495,789,488	1	\$1,184,529,784
Pennsylvania.....	1,142,942,707	743,664,705	322,252,720	77,025,282	2	1,955,551,332	2	1,211,880,027	2	899,408,028
Illinois.....	840,057,316	463,039,532	344,312,703	32,705,081	3	1,410,342,129	3	947,302,597	3	605,909,813
Massachusetts.....	626,410,431	400,395,663	205,291,665	20,723,103	4	1,124,092,051	4	723,696,388	4	524,489,309
Ohio.....	527,636,585	359,265,800	133,857,755	34,513,030	5	960,811,857	5	601,540,057	5	471,452,717
New Jersey.....	470,449,176	333,555,928	119,113,424	17,779,824	6	774,360,025	6	440,812,097	6	324,448,561
Missouri.....	252,258,417	133,936,373	109,849,753	8,472,291	7	439,548,957	7	305,612,584	7	196,876,618
Michigan.....	230,080,931	131,261,362	85,504,672	13,314,897	8	420,120,060	9	297,858,698	7	214,435,201
Wisconsin.....	227,255,092	108,657,559	108,880,909	9,710,624	9	411,139,681	8	302,482,122	9	195,362,191
Indiana.....	220,507,007	123,239,700	85,687,367	11,579,940	10	303,954,405	10	270,714,705	10	186,163,976

¹ Obtained by deducting cost of raw materials from net value of products and adding amount expended for mill supplies.

Defects in the value of products.—Many influences have combined to produce inaccuracies in the value of the products as reported. These are due in large part to the different interpretations placed upon the meaning of "the price at the factory" and to the rapidly growing tendency to concentrate different though dependent industries under one management.

The object of the Census inquiry was to obtain the total value or price at the factory or works of all products manufactured during the year. While the majority of the products are disposed of during the year of manufacture, there are many establishments for which the production will not correspond with the sales for a given year, so that its value can not be ascertained except by an estimate.

Normally the price at the factory should be sufficiently large to embrace the cost of the items of expense enumerated upon the schedule, plus the charges for the use of capital and the reward of the manufacturer, and would be regulated by the market price of the commodity. It was not intended that the aggregate value reported should take into consideration losses through bad accounts or through operating or financial mismanagement, nor that it should include increased values resulting from extensive retailing or long credit transactions. As a result, if it were possible to obtain a uniform compliance with the instructions, the selling price or value at the factory would be fairly consistent for the same product. Instead, however, the different interpretations of the meaning of the inquiry have resulted in widely varying values for the products of different establishments manufacturing the same goods. This becomes evident from the replies of different manufacturers to questions asking how they arrived at their results.

One manufacturer stated, for example, that "the inquiry was framed in accordance with the statute and called for the value of the product, which can only be ascertained by considering the actual cost of pro-

duction of the articles as a product, including the materials and labor. This is what we have furnished in answer to the question, and the figures given by us, therefore, are not based upon the selling prices, or upon estimates of what the goods are expected to bring when sold, and do not include any part of the cost of sale." Another states that "their method of computing value of product (factory value) is to figure the same as being equal to the sum of all expenditures. To obtain the selling value would necessitate two or three months' work by several clerks." Other extremes of values are found in the reports for establishments that can furnish only the gross selling value. Some establishments report such values and contend that, although they are list values and subject to large trade discounts, contingent liabilities, etc., it is the only value that can be given for the total annual production. It is obvious that the combination of values so differently obtained can not lead to uniform results.

Another instance of the lack of harmony in reporting values is found in industries where certain fixed charges on the product will be paid by some manufacturers, while others sell the products and the purchaser assumes the responsibility for the charges. This condition is found particularly in the manufacture of distilled and malt liquors and other products subject to internal revenue taxes. Many distillers pay the tax themselves and include the amount in the value of the products, it being considered a legitimate element of cost; others sell the product in bond, the purchaser assuming the responsibility for the tax, so that as no expense of this character was incurred, it is not considered in fixing the value of product.

It is the practice in some sections of the country for cigar manufacturers, in most cases proprietors of small establishments only, to buy or raise their own tobacco, manufacture cigars, and sell the product on the bench at a certain fixed price per thousand, exclusive of revenue tax and the cost of boxes. The pur-

chaser of the cigars buys the revenue stamps and the boxes in the name of the manufacturer; the manufacturer, however, reports the value of his product exclusive of these expenses. The inconsistency arising from the inclusion or exclusion of revenue taxes could probably be remedied by establishing a uniform rule for its exclusion. Such a rule, however, would affect the comparisons with former censuses and result in apparent decreases where none has occurred.

By means of the concentration of closely related or dependent processes, it is becoming more and more the policy of the manufacturer to secure under one management an uninterrupted series of processes from the raw material to the finished product. As the partially manufactured articles which are components of the finished product are not marketed, but merely delivered from one department to another, no market value is assigned them, but they are carried on the books at some arbitrary valuation, usually equal to the expenditure for labor, miscellaneous expenses, and materials. When such valuations, aggregating large totals, are added to the product of independent establishments, which report a value which includes all the expenses of production, the result can not reflect accurately the output of the industry. Furthermore, when such totals are compared with censuses whose statistics are affected in much less degree or not at all by the concentration movement, the results must be misleading.

As an example of this, let it be supposed that in 1899, 10,000,000 tons of pig iron were manufactured, of which 5,000,000 were sold at an average of \$12 per ton at the works and 5,000,000 were used as materials at works controlled by the manufacturers of pig iron, their value being given at cost and aggregating \$50,000,000; and that in 1904, 11,000,000 tons of pig iron were produced, of which 10,000,000 tons were used as materials at steel works and rolling mills connected with the blast furnaces, at an aggregate cost of \$80,000,000, while only 1,000,000 tons were sold at an average of \$15 per ton at the works. The quantities and values would compare as follows:

YEAR.	Tons.	Value.
1899.....	10,000,000	\$110,000,000
1904.....	11,000,000	95,000,000

The comparison would show an increase in quantity and a reduction in value, notwithstanding the advanced price per ton at the works. Although this case is hypothetical, yet widely varying returns of value in this and other industries are often directly attributable to such industrial changes. In fact, where concentration had taken place the value placed on products to be consumed as material was in some instances less than the actual cost of production and had no relation to the price or value at the factory.

Custom work.—The accuracy of the value of products as a consistent measure of the manufactured output is

further impaired by the inclusion of the amount received for custom work. This amount was reported under products, because the cost of such work forms part of the general cost of operating the factory, and therefore must be a part of the "total value of all products." When custom work pertained to the finishing of materials furnished in a partially manufactured form, the problem presented little difficulty, inasmuch as the amount received for custom work by one establishment was added to the product of the other which manufactures the material, and the sum represented the value of the finished product; but when the material is consumed in the raw state its cost would not appear in the census of manufactures. To remedy this, the estimated value of the materials operated upon may in such cases be entered under "materials used," and the value of the product may be calculated as the sum of the estimated cost of such materials and the amount received for custom work.

This method has the advantage of simplicity; it is not, however, without defects. In the first place it fails to secure the desired uniformity of results for all establishments regardless of the state of materials used. This may be illustrated in a number of industries.

Take, for example, two copper smelters, each treating a quantity of copper ore valued at \$100,000, and adding \$10,000 to the value of the materials by smelting; suppose one bought all its ore, while the other treated it all on tolls. The first reports \$110,000 as the value of its product, the second only \$10,000, in all \$120,000. We add \$100,000 to the product of the second and arrive at a total of \$220,000.

Take, further, two clothing factories, of which one manufactures complete garments of the value of \$110,000, while the other does contract work on garments cut at another factory; and suppose that the finished garments in the second case are also worth \$110,000 and that the amount received by the contractor is \$10,000. The total value of product reported for the two factories where the garments are finished will then be \$120,000; but if we add the third factory, where the garments are cut and given out to be finished on contract, the total will be \$230,000.

The actual value of the finished product in each of the foregoing examples was in reality \$220,000, but in the Census returns copper smelters will appear with a product of \$220,000, and clothing factories where finished garments are produced with \$120,000; on the other hand, if the factories producing half manufactured articles are also included, then the copper smelting industry will show, as before, \$220,000, and the clothing industry, \$230,000. If, on the contrary, the value of materials upon which custom work was done is eliminated, each industry will appear with a product of \$120,000.

It may thus be said that the total value of products shown by the census is composed of values which are not sufficiently uniform to furnish a means for measuring

accurately the value of the output of certain commodities. While this is true in individual cases, yet the value of the total production permits of an approximate determination of the industrial greatness and growth in manufactures of the United States. Viewed from this standpoint it is invaluable.

Apparently the only method of obtaining a uniform and consistent amount for the value of product is to consider the sum of the salaries, wages, miscellaneous expenses, and cost of materials as the value at the factory of all products manufactured during the year. It is true that this does not represent the sum of the expenses of production which make up the average value of the products, but these expenses, with the exception of those noted above, the Census Bureau does not attempt to ascertain correctly, so that the margin between the expenses of production enumerated upon the schedule and the value of the products as it has been hitherto obtained in no way accurately reflects the profits of the manufacturer. Moreover, this margin is the primary cause for the principal inconsistencies which are contained in the value of the products. Therefore to obtain the value of the products by balancing the schedule would simplify the return and avoid the necessity of a direct inquiry concerning value, to which, in the form used, there has been much objection.

This objection is especially pronounced when the quantity and value of the different classes of products are required, such as the number and value of "men's boots and shoes," "boys' and youths' boots and shoes," "women's boots and shoes," "misses' and children's boots and shoes," etc., which are specified on the special schedule for the boot and shoe industry. In many cases the total value given for those products is based on an average value for the entire year. The manufacturers contend that they have no value other than the cost of production or the list price. A value of this character could be as accurately computed in the Census Office, if the quantities were accurately reported.

Industrial activity during the census year.—The cost of production does not always control the selling price of manufactured commodities. During periods of depression the manufacturer is often compelled to sacrifice his products at a price below the cost of production, unless he is willing to lock up his capital in his goods and wait for better prices. Such periods produce a general low level of prices and tend to decrease the rate of production. As an indication of rate of growth, the value of a comparison between a census taken during a year of depression and a previous census for a normal or prosperous year would therefore be seriously impaired.

Moreover, some of the establishments reported at the census of 1905 were not in operation in 1904 for the entire year, while others were operated on part time during portions of the year. The vast majority operated on full or normal time during the year, but the

total does not represent a full year's production for all existing factories.

During the first half of 1904 business conditions were in a state of some depression. Failures were above the average and commodities reached the lowest prices of the year on July 1.¹ Notwithstanding a marked recovery during the last three months of the year, 1904 could not, as a whole, be considered a prosperous year from an industrial standpoint. The most significant indications of the depression which characterized the greater part of the year are afforded (1) by the decrease in the tonnage of manufactured staples carried by the railroads; (2) by the decreased earnings of several of the greatest industrial combinations; and (3) by decreases in the production of the great staples of manufacture.

Although there was an increase in the tonnage of all freight carried by the railroads during the year ending June 30, 1904, yet the relative increase was much smaller than in former years. Furthermore, the increases were confined for the most part to the transportation of products of agriculture, while decreases were recorded in the tonnage of several of the great manufactured staples. Tables LIX and LX, prepared from the reports of the Interstate Commerce Commission for the United States as a system, illustrate these conditions.

TABLE LIX.—*Comparative summary—per cent of aggregate tonnage reported as originating on the line, distributed according to the sources of products: 1904, 1903, and 1902.*¹

	1904	1903	1902
Products of agriculture.....	9.50	9.56	9.23
Products of animals.....	2.74	2.63	2.64
Products of mines.....	51.56	51.56	52.36
Products of forest.....	12.53	11.67	11.64
Manufactures.....	13.41	14.39	14.49
Merchandise.....	4.83	4.69	4.37
Miscellaneous.....	5.34	5.50	5.27

¹ "Statistics of Railways in the United States," Interstate Commerce Commission, 1902, pages 68 and 69; 1903, pages 71 to 73; 1904, pages 73 and 74.

The percentage which the tonnage of manufactures formed of the aggregate tonnage of freight carried by the railroads showed a slight decrease from 1902 to 1903 and a marked decrease from 1903 to 1904. This decrease is the most significant feature of the table, as no other source of production shows either an increase or decrease of so decided a character in the course of a year. This decrease of nearly 1 per cent must therefore be considered as unusual and as reflecting the unsatisfactory condition of the industrial world during the greater part of 1904.

The table shows that the tonnage of the staple commodities selected was not as great during 1904 as during the previous year, and in a number of cases showed decreases from the tonnage carried two years previous. The rate of increase of total tonnage carried was but five-tenths of 1 per cent in 1904 against 9.8 per cent for 1903.

¹ Dun's Review of Trade, December 31, 1904.

TABLE LX.—Comparative summary—freight traffic movement for selected commodities: 1904, 1903, and 1902.¹

COMMODITY.	TONNAGE ORIGINATING ON THE ROAD.		
	1904	1903	1902
Total.....	641,680,547	638,800,658	581,832,441
Coke.....	21,858,790	26,126,220	22,807,620
Petroleum and other oils.....	4,809,349	4,900,723	4,837,413
Iron, pig and bloom.....	15,255,251	16,004,060	14,714,989
Iron and steel rails.....	3,878,772	5,124,081	4,849,255
Other castings and machinery.....	9,442,694	11,133,353	9,096,438
Bar and sheet metal.....	9,411,655	11,721,064	10,624,712
Agricultural implements.....	1,101,794	1,233,450	1,257,932
All other.....	575,922,242	561,956,501	512,994,087

¹ "Statistics of Railways in the United States," Interstate Commerce Commission, 1904, page 73; 1903, page 71; 1902, page 68.

Further evidence of a similar nature, based upon revenue instead of tonnage, is contained in Table LXI.

TABLE LXI.—Increases in freight revenue compared, for years ending June 30, 1904, 1903, 1902, 1901, and 1900.¹

YEARS (ENDING JUNE 30).	Amount.	Percent.
Increase—1904 over 1903.....	\$40,982,667	3.06
Increase—1903 over 1902.....	130,791,181	10.83
Increase—1902 over 1901.....	88,685,831	7.93
Increase—1901 over 1900.....	69,286,661	6.60
Increase—1900 over 1899.....	135,519,168	14.83

¹ "Statistics of Railways in the United States," Interstate Commerce Commission, 1904, page 83; 1903, page 80; 1902, page 76; 1901, page 73; 1900, page 78.

During the past five years there were no decreases in freight revenues for the United States considered as a system, but the rate of increase was less for 1904 than for any other year shown, and the actual amount of increase was much less than for any of the four years previous. Furthermore, the increase in the gross receipts of the railroads in 1904 was not sufficient to maintain the margin between operating expenses and gross receipts which was shown in 1903, so that the income from operation decreased \$135 per mile of line.

The dividends of the great industrial combinations afforded ample evidence of the depression which prevailed throughout most of 1904. So much were their earnings reduced that the dividends declared by them as a result of operations for 1904 lacked nearly \$5,000,000 of equaling the disbursements to the stockholders on the same account for the year previous.¹

The unflinching index to industrial conditions—the iron and steel trade—underwent exceptional depression during the spring and summer of the year, and the fall revival did not recoup the manufacturers for

the losses incurred earlier in the year. The production of pig iron for 1904 was nearly 2,000,000 tons less than in the previous year, over 1,000,000 tons less than the production for 1902, and only about 400,000 tons more than for the year 1901. The average yearly prices for all forms of iron and steel were much lower for 1904 than for any previous year. The common stock of the United States Steel Company reached a new low level in May and June, and the preferred also dropped to a very low level in the same months. The Annual Statistical Report of the American Iron and Steel Association stated that "the production during the year was less in many lines than in 1903, the increased activity in the last four months of the year falling very far short of equaling the losses in production during the remainder of the year."

The depression which characterized the first half of the year in several leading industries was not by any means universal, however, and the confidence of the American manufacturers that it would only be temporary resulted in little, if any, falling off in production. The increased demand of the last three months of the year fully justified this confidence, and found the factories of the country ready to meet the boom which followed. Thus the census year, while not a highly prosperous one from the manufacturer's standpoint, yet, if the volume of output in all lines of manufactures is considered, probably equaled in production the preceding year, and exceeded the other years intervening since the Twelfth Census. The number of people employed, the amount of wages paid, the value of the products, the statistics of production of the great staples required as raw material in manufactures, the movement by rail of commodities in general, exports and imports, the volume of money in circulation, all indicate that the industrial development of the country had steadily progressed, notwithstanding the temporary depression. But the low prices which prevailed throughout the first nine months of the census year 1904 must have affected the values reported at the census in several industries, although to what extent it is impossible to determine. It is certain, however, that in the iron and steel industry there was an actual increase during the intercensal period greater than the figures would appear to indicate. Although this may be true of other industries, it is not possible to state the facts with any degree of accuracy. In view of the conditions during 1904, however, the conclusion that in general the growth in manufactures during the past five years was greater than the figures indicate is amply justified.

¹ The Journal of Commerce and Commercial Bulletin, December 31, 1904.

CHAPTER VII.

LARGE AND SMALL ESTABLISHMENTS.

The rapid development of large industrial enterprises has given rise to the belief that in many lines of industry a comparatively few establishments control a large proportion of the production. The report for the census of 1905, however, contains the first compilation of statistics that shows the extent of this concentration in large establishments for all branches of manufactures. To make such a presentation, it is necessary first to establish some standard for measuring the size of an establishment.

The size or importance of an establishment may be determined by the amount of capital invested, the number of employees, total amount paid in wages, or the value of its products. Capital, however, was reported with such lack of uniformity and was subject to so many uncertainties, that it could not, with safety, be used for this purpose. The gross value of product and the greatest number of wage-earners employed at any one time during the year were accordingly selected as the basis of measurement. Three methods have been adopted for presenting the statistics.

1. The number of establishments, capital, number of wage-earners, wages, miscellaneous expenses, cost of materials, and value of products are shown for five classes of establishments, grouped according to the value of products. It was practicable to employ this method to show the totals for all establishments in the United States and in each state and territory, and also for the leading industries of each state. The statistics are given in Table 10 and in the reports on the manufactures of the different states in Part II.

2. The number of establishments and value of products are shown for the five classes according to value of products, for each of the 339 classifications of industries. This method is followed in Table 11.

3. The establishments for all industries in the United States and in each state and territory, and for each of the 339 classifications of industry, are shown for 8 groups according to the greatest number of wage-earners employed at any one time during the year. This method is followed in Tables 15 and 16.

Table LXII summarizes the totals obtained for the United States by the application of the first method.

TABLE LXII.—COMPARATIVE SUMMARY FOR ALL ESTABLISHMENTS IN THE UNITED STATES, GROUPED BY VALUE OF PRODUCTS, WITH PERCENTAGES: 1905.

GROUP, ACCORDING TO VALUE OF PRODUCTS.	ESTABLISH- MENTS.		CAPITAL.		WAGE-EARNERS AND WAGES.				MISCELLANEOUS EXPENSES.		COST OF MATE- RIALS USED.		VALUE OF PRODUCTS INCLUDING CUS- TOM WORK AND REPAIRING.	
	Num- ber.	Per cent.	Amount.	Per cent.	Average number.	Per cent.	Wages.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.
United States....	216,262	100.0	\$12,686,265,673	100.0	5,470,321	100.0	\$2,611,540,532	100.0	\$1,455,019,473	100.0	\$8,503,949,756	100.0	\$14,802,147,087	100.0
Less than \$5,000.....	71,162	32.9	165,317,454	1.3	106,366	1.9	40,941,804	1.6	21,399,462	1.5	61,360,114	0.7	176,159,127	1.2
\$5,000 but less than \$20,000.....	72,806	33.7	531,130,513	4.2	419,566	7.7	188,290,652	7.2	70,330,717	4.8	326,098,295	3.8	751,236,681	5.1
\$20,000 but less than \$100,000.....	48,113	22.2	1,654,931,649	13.0	1,027,507	18.8	477,153,001	18.3	199,395,653	13.7	1,039,497,004	12.2	2,130,227,091	14.4
\$100,000 but less than \$1,000,000.....	22,281	10.3	5,550,459,933	43.8	2,516,429	46.0	1,194,450,018	45.7	657,328,272	45.2	3,320,508,388	39.2	6,116,068,017	41.3
\$1,000,000 and over.....	1,900	0.9	4,784,426,124	37.7	1,400,453	25.6	710,705,057	27.2	500,565,369	34.8	3,740,586,955	44.1	5,628,456,171	38.0

This table shows the extent of the concentration of manufactures in large establishments, but in considering the statistics the definition of an establishment should be constantly kept in mind.¹ Of the 216,262 establishments reported for the entire country, 71,162 had products valued at less than \$5,000 each and for a factory census would therefore be considered as small. While such establishments formed 32.9 per cent of the total number, they gave

employment to only 1.9 per cent of the wage-earners and their products constituted only 1.2 per cent of the total value of products. By combining the two groups with products valued at less than \$20,000, results are obtained for all establishments of inconsiderable magnitude. Such establishments numbered 143,968 and formed 66.6 per cent of the total number of establishments, but they gave employment to only 9.6 per cent of the wage-earners and their products formed only 6.3 per cent of the total value of products. On the other hand, the 72,294 establishments with products valued at

¹See page xli.

LARGE AND SMALL ESTABLISHMENTS.

CXV

\$20,000 and over formed only 33.4 per cent of the total number, but they gave employment to 90.4 per cent of the wage-earners and their products formed 93.7 per cent of the total value of products. There were only 1,900 establishments having products valued at \$1,000,000 and over. These, however, gave employment to 25.6 per cent of the wage-earners and their products formed 38 per cent of the total value of products for all establishments. The 24,181 establishments each reporting a product valued at \$100,000 or more may be considered as the large manufacturing establishments of the country. They employed on the average during the year 3,916,882 wage-earners, or an average of 162 to each establishment. Their wage-earners represented 71.6 per cent and their products 79.3 per cent of the totals for all establishments.

Table 10 shows that in 18 of the states and territories these large establishments gave employment to more than 70 per cent of the wage-earners. Of the 4 leading states in value of products, Massachusetts had the largest percentage of establishments with products valued at \$100,000 and over, while the largest percentage of the value of products for such establish-

ments was in Illinois and the largest actual value in New York. Considering all states and territories, the greatest concentration of capital in establishments with products of \$100,000 and over is shown for Montana, Rhode Island, New Jersey, Massachusetts, and Connecticut, in the order named. In Montana the large establishments reported 91.8 per cent of the capital and those in Connecticut, 87.3 per cent. The greatest concentration in the number of wage-earners employed is shown for Rhode Island, Connecticut, Arizona, Massachusetts, and New Hampshire, the large establishments in Rhode Island reporting 86.7 per cent of the wage-earners for the whole state and those in New Hampshire 79.4 per cent. Montana, Arizona, Rhode Island, and Nebraska show the greatest concentration in value of products. The large establishments in Montana reported 92.2 per cent of the value of products for the state and those in Nebraska 87.1 per cent.

Table LXIII illustrates the second method of presenting the statistics for large and small establishments. It shows the totals for the 5 groups of establishments in each of the 14 generic groups of industries.

TABLE LXIII.—ESTABLISHMENTS, BY VALUE OF PRODUCTS, DISTRIBUTED ACCORDING TO GROUPS OF INDUSTRIES: 1905.

GROUP.	Total.		ESTABLISHMENTS REPORTING PRODUCTS VALUED AT—									
			Less than \$5,000.		\$5,000 but less than \$20,000.		\$20,000 but less than \$100,000.		\$100,000 but less than \$1,000,000.		\$1,000,000 and over.	
	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.
United States.....	216,262	\$14,802,147,087	71,162	\$176,159,127	72,806	\$751,236,681	48,118	\$2,130,227,091	22,281	\$6,116,068,017	1,900	\$5,628,456,171
Food and kindred products..	45,790	2,845,234,900	11,292	32,887,319	20,899	217,584,508	10,340	423,825,085	2,975	802,057,438	284	1,368,880,550
Textiles.....	17,042	2,147,441,418	2,454	6,637,758	4,774	51,563,812	5,340	258,905,477	4,132	1,174,229,045	342	656,105,326
Iron and steel and their products.....	14,230	2,176,739,726	2,800	7,502,605	4,088	44,487,053	4,109	194,912,601	2,735	804,514,807	357	1,125,202,480
Lumber and its remanufactures.....	32,726	1,223,730,336	10,433	26,837,627	11,257	110,925,829	8,107	361,773,901	2,886	655,952,400	43	62,240,579
Leather and its finished products.....	4,945	705,747,470	740	1,002,198	1,493	15,858,343	1,350	65,066,040	1,241	403,992,524	115	218,028,365
Paper and printing.....	30,787	857,112,256	16,329	38,368,573	8,643	83,479,987	4,192	180,051,212	1,541	412,122,545	82	143,089,639
Liquors and beverages.....	6,381	501,266,605	2,627	6,531,470	1,859	17,466,642	1,005	47,201,500	819	240,310,707	71	189,747,286
Chemicals and allied products.....	9,680	1,031,065,263	2,290	5,364,606	2,849	31,663,457	2,898	129,427,897	1,489	407,025,660	164	458,483,643
Clay, glass, and stone products.....	10,775	391,230,422	3,190	8,169,272	3,886	41,055,906	2,844	122,904,192	844	200,000,663	11	19,094,329
Metals and metal products, other than iron and steel..	6,310	922,262,456	1,111	3,101,847	2,373	25,201,575	1,932	84,535,266	766	217,550,334	128	501,873,434
Tobacco.....	16,828	331,117,681	11,603	23,131,376	3,657	34,070,684	1,056	43,639,566	379	107,275,234	43	123,000,821
Vehicles for land transportation.....	7,255	643,924,442	2,260	6,278,183	2,592	25,537,365	1,368	60,807,558	944	289,107,883	115	262,193,453
Shipbuilding.....	1,097	82,760,239	486	1,065,751	296	2,986,779	209	9,144,370	90	21,484,372	16	48,087,067
Miscellaneous industries.....	12,377	941,604,873	3,355	8,320,452	4,140	43,354,681	3,303	148,032,336	1,440	380,429,105	130	361,468,290

In the "food and kindred products" group there were 45,790 establishments, or 21.2 per cent of the total number in the United States. This was the largest proportion contained in any one group, the two groups next in this particular being "lumber and its remanufactures" and "paper and printing," containing 15.1 per cent and 14.2 per cent, respectively, of the total number of establishments.

The magnitude of the operations of the different classes of establishments is shown by this table, but to

comprehend the relative importance of these classes it is necessary to consider two series of percentages—(1) the percentage that the number of establishments and the value of products for each class constitute of the totals for each generic group of industries, and (2) the percentage that the number of establishments and the value of products for each group of industries constitute of the total for each of the five classes. These percentages are given in Tables LXIV and LXV.

MANUFACTURES.

TABLE LXIV.—ESTABLISHMENTS BY VALUE OF PRODUCTS—PER CENT IN EACH CLASS OF TOTAL NUMBER AND VALUE OF PRODUCTS, FOR EACH GROUP OF INDUSTRIES: 1905.

GROUP.	Total.		ESTABLISHMENTS REPORTING PRODUCTS VALUED AT—									
			Less than \$5,000.		\$5,000 but less than \$20,000.		\$20,000 but less than \$100,000.		\$100,000 but less than \$1,000,000.		\$1,000,000 and over.	
	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.
United States.....	100.0	100.0	32.9	1.2	33.7	5.1	22.2	14.4	10.3	41.3	0.9	38.0
Food and kindred products.....	100.0	100.0	24.7	1.2	45.6	7.0	22.6	14.9	6.5	28.2	0.6	48.1
Textiles.....	100.0	100.0	14.4	0.3	28.0	2.4	31.3	12.1	24.3	54.7	2.0	30.5
Iron and steel and their products.....	100.0	100.0	20.3	0.3	28.7	2.0	29.3	9.0	19.2	37.0	2.5	51.7
Lumber and its remanufactures.....	100.0	100.0	31.9	2.2	34.4	9.5	24.8	29.6	8.8	53.6	0.1	5.1
Leather and its finished products.....	100.0	100.0	15.1	0.3	30.2	2.3	27.3	9.2	25.1	57.2	2.3	31.0
Paper and printing.....	100.0	100.0	53.0	4.5	28.1	9.7	13.6	21.0	5.0	48.1	0.3	16.7
Liquors and beverages.....	100.0	100.0	41.2	1.3	29.1	3.5	15.8	9.4	12.8	47.9	1.1	37.9
Chemicals and allied products.....	100.0	100.0	23.7	0.5	29.4	3.1	29.9	12.6	15.4	39.4	1.6	44.4
Clay, glass, and stone products.....	100.0	100.0	29.6	2.1	36.1	10.5	26.4	31.4	7.8	51.1	0.1	4.0
Metals and metal products, other than iron and steel.....	100.0	100.0	17.5	0.3	37.6	2.7	30.6	9.2	12.2	23.6	2.0	64.2
Tobacco.....	100.0	100.0	69.5	7.0	21.7	10.3	6.3	13.2	2.2	32.4	0.3	37.1
Vehicles for land transportation.....	100.0	100.0	31.1	1.0	35.6	4.0	18.8	9.4	12.9	44.9	1.6	40.7
Shipbuilding.....	100.0	100.0	44.3	1.3	27.0	3.6	19.0	11.0	8.2	26.0	1.5	58.1
Miscellaneous industries.....	100.0	100.0	27.1	0.9	33.5	4.6	26.7	15.7	11.6	40.4	1.1	38.4

TABLE LXV.—ESTABLISHMENTS BY VALUE OF PRODUCTS—PER CENT IN EACH GROUP OF INDUSTRIES, OF TOTAL NUMBER AND VALUE OF PRODUCTS FOR EACH CLASS: 1905.

GROUP.	Total.		ESTABLISHMENTS REPORTING PRODUCTS VALUED AT—									
			Less than \$5,000.		\$5,000 but less than \$20,000.		\$20,000 but less than \$100,000.		\$100,000 but less than \$1,000,000.		\$1,000,000 and over.	
	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.
United States.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Food and kindred products.....	21.2	19.2	15.9	18.7	28.7	29.0	21.5	19.9	13.3	13.1	14.9	24.3
Textiles.....	7.9	14.5	3.4	3.8	6.6	6.9	11.1	12.2	18.5	19.2	18.0	11.7
Iron and steel and their products.....	6.6	14.7	4.1	4.3	5.6	5.9	8.7	9.1	12.3	13.2	18.8	20.0
Lumber and its remanufactures.....	15.1	8.3	14.7	15.2	15.5	15.6	16.9	17.0	13.0	10.7	2.3	1.1
Leather and its finished products.....	2.3	4.8	1.0	1.1	2.0	2.1	2.8	3.1	5.6	6.6	6.1	3.9
Paper and printing.....	14.2	5.8	22.9	21.8	11.9	11.1	8.7	8.4	6.9	6.7	4.3	2.5
Liquors and beverages.....	2.9	3.4	3.7	3.7	2.5	2.3	2.1	2.2	3.7	3.9	3.7	3.4
Chemicals and allied products.....	4.5	7.0	3.2	3.0	3.9	4.2	6.0	6.1	6.7	6.7	8.1	8.1
Clay, glass, and stone products.....	5.0	2.6	4.5	4.6	5.3	5.5	5.9	5.8	3.8	3.3	0.6	0.3
Metals and metal products, other than iron and steel.....	2.9	6.2	1.6	1.8	3.3	3.3	4.0	4.0	3.4	3.6	6.7	10.5
Tobacco.....	7.8	2.2	16.4	13.1	5.0	4.5	2.2	2.0	1.7	1.8	2.3	2.2
Vehicles for land transportation.....	3.4	4.3	3.2	3.6	3.6	3.4	2.8	2.9	4.2	4.7	6.1	4.7
Shipbuilding.....	0.5	0.6	0.7	0.8	0.4	0.4	0.4	0.4	0.4	0.3	0.8	0.9
Miscellaneous industries.....	5.7	6.4	4.7	4.7	5.7	5.8	6.9	6.9	6.5	6.2	7.3	6.4

Table LXIV indicates the extent to which the value of the products of each of the 14 generic groups of industries is controlled by the small, medium sized, and large establishments, respectively, and Table LXV, the percentage contributed by each generic group of industries to the total of each of the five classes of establishments. Considering the total for all industries, as shown by Table LXIII, the largest number of establishments, 72,806, were of a medium size, reporting a product valued at from \$5,000 to \$20,000, while the largest value of products, \$6,116,068,017, was reported for the large establishments with products valued at \$100,000 but less than \$1,000,000. It

appears that of the 14 groups of industries, "iron and steel and their products" contains the largest actual number, 357, and the largest relative number, 2.5 per cent, of establishments with products valued at \$1,000,000 and over. While the products of these establishments amounted in value to \$1,125,262,480, they were exceeded by the value of products of the establishments engaged in the manufacture of food and kindred products, and followed by those engaged in the textile industries. Table LXV shows that the value of products of the establishments in these three groups of industries represents 56 per cent of the total value of products for the class having products valued

at \$1,000,000 and over. In other words, more than half of the very large establishments, reporting more than half of the total value of products in this class, are found in three of the basic industries of the country. Next to these industries the manufacture of metals and metal products other than iron and steel reports the largest actual value of products for establishments of this class. This group of industries also shows its greatest concentration in the class with products valued at \$1,000,000 and over, which represents 64.2 per cent of the total value of products for the group.

"Paper and printing," "tobacco," and "food and kindred products" contain the largest proportion of the very small establishments, those with products valued at less than \$5,000. But as shown by Table LXIV,

while the number of establishments in this class forms a large proportion of the total number, their products form only a small percentage of the total value of products for each generic group of industries. "Food and kindred products," "lumber and its remanufactures," and "paper and printing" contain the largest proportion of medium-sized establishments, or those with products ranging in value from \$5,000 to \$100,000.

Table 11 presents for each of the 339 classifications of industries statistics similar to those given in Table LXIII. Table LXVI reproduces this information for 23 selected industries, and Table LXVII shows the percentage that the number of establishments and value of products for each of the five classes of establishments constitute of the total for each industry.

TABLE LXVI.—ESTABLISHMENTS BY VALUE OF PRODUCTS FOR SELECTED INDUSTRIES: 1905.

INDUSTRY.	Total.		ESTABLISHMENTS REPORTING PRODUCTS VALUED AT—									
			Less than \$5,000.		\$5,000 but less than \$20,000.		\$20,000 but less than \$100,000.		\$100,000 but less than \$1,000,000.		\$1,000,000 and over.	
	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.
Total.....	94,623	\$7,282,763,378	35,247	\$82,269,073	27,375	\$283,876,840	20,146	\$913,321,493	10,898	\$3,073,956,074	957	\$2,929,339,808
Boots and shoes.....	1,316	320,107,458	142	377,046	239	2,507,986	362	18,248,001	511	179,804,623	62	119,079,802
Clothing, men's.....	4,504	355,796,571	830	2,287,748	1,771	18,519,969	1,153	52,727,542	701	193,816,622	49	88,444,690
Clothing, women's.....	3,351	247,661,560	288	829,184	939	10,571,614	1,438	70,812,553	675	151,410,497	11	14,037,712
Cotton goods.....	1,077	442,461,218	16	43,855	30	493,052	236	13,975,106	687	230,055,073	99	197,884,132
Electrical machinery, apparatus, and supplies.....	784	140,809,369	94	247,750	246	2,747,791	278	13,231,592	144	39,427,942	22	85,154,294
Flour and grist mill products.....	10,051	713,033,305	514	1,869,134	4,166	48,748,520	4,245	179,263,525	1,039	280,199,762	87	202,952,454
Foundry and machine shop products.....	8,993	685,901,388	1,932	5,107,603	2,781	30,238,027	2,785	120,499,984	1,414	377,285,504	81	143,770,120
Furniture.....	2,482	170,446,825	346	922,952	611	6,698,078	1,030	50,758,124	487	99,544,114	8	12,523,557
Gas, illuminating and heating.....	1,019	125,144,945	193	503,016	362	4,094,009	316	14,087,898	124	32,561,811	24	73,898,211
Glass.....	399	79,607,998	9	24,738	24	279,562	181	8,036,868	230	62,274,058	5	8,992,772
Hosiery and knit goods.....	1,079	136,558,139	79	216,836	180	2,135,207	444	22,540,419	365	96,646,967	11	15,018,710
Iron and steel, steel works and rolling mills.....	415	673,965,026	5	14,769	8	119,179	44	2,357,509	227	101,297,782	131	570,175,787
Leather, tanned, curried, and finished.....	1,049	252,620,986	171	367,636	166	1,784,182	244	12,911,730	420	146,000,213	48	91,557,225
Liquors, malt.....	1,531	208,358,732	128	351,150	258	2,905,990	479	25,220,491	620	185,751,904	46	84,069,197
Lumber and timber products.....	19,127	580,022,690	7,131	18,722,775	7,049	72,223,143	3,671	154,690,787	1,254	304,467,321	22	29,918,664
Paper and wood pulp.....	761	188,715,189	23	74,086	59	749,259	254	14,204,394	395	126,385,746	30	47,301,705
Petroleum, refining.....	98	175,005,320	3	11,112	0	76,683	19	978,691	51	19,389,349	19	154,549,485
Printing and publishing, newspapers and periodicals.....	18,038	309,327,606	11,509	26,805,495	4,608	42,350,712	1,477	61,103,719	411	110,591,677	33	68,476,003
Slaughtering and meat packing, wholesale.....	559	801,757,137	11	41,151	54	604,770	165	8,100,374	243	81,679,749	86	711,241,093
Slaughtering, wholesale, not including meat packing.....	370	112,157,487	3	9,934	67	838,250	136	6,695,147	140	42,633,214	24	61,980,942
Tobacco, chewing and smoking, and snuff.....	433	116,767,630	188	359,300	80	804,350	71	3,724,127	68	22,468,882	26	89,410,971
Tobacco, cigars and cigarettes.....	16,395	214,350,051	11,505	22,772,076	3,577	33,266,334	985	39,915,439	311	84,806,352	17	33,589,850
Woolen goods.....	792	142,196,658	127	309,667	85	880,173	183	10,237,473	381	105,456,823	16	25,312,522

MANUFACTURES.

TABLE LXVII.—ESTABLISHMENTS BY VALUE OF PRODUCTS—PER CENT IN EACH CLASS OF TOTAL NUMBER AND VALUE OF PRODUCTS FOR SELECTED INDUSTRIES: 1905.

INDUSTRY.	Total.		ESTABLISHMENTS REPORTING PRODUCTS VALUED AT—									
			Less than \$5,000.		\$5,000 but less than \$20,000.		\$20,000 but less than \$100,000.		\$100,000 but less than \$1,000,000.		\$1,000,000 and over.	
	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.	Number of establishments.	Value of products.
Total.....	100.0	100.0	37.3	1.1	28.9	3.9	21.3	12.0	11.5	42.2	1.0	40.2
Boots and shoes.....	100.0	100.0	10.8	0.1	18.2	0.8	27.5	5.7	38.8	56.2	4.7	37.2
Clothing, men's.....	100.0	100.0	18.4	0.6	39.3	5.2	25.6	14.8	15.6	54.5	1.1	24.9
Clothing, women's.....	100.0	100.0	8.6	0.3	28.0	4.3	42.9	28.6	20.2	61.1	0.3	5.7
Cotton goods.....	100.0	100.0	1.5	(¹)	3.6	0.1	21.9	3.2	63.8	52.0	9.2	44.7
Electrical machinery, apparatus, and supplies.....	100.0	100.0	12.0	0.2	31.4	1.9	35.4	9.4	18.4	28.0	2.8	60.5
Flour and grist mill products.....	100.0	100.0	5.1	0.3	41.5	6.8	42.2	25.1	10.3	39.3	0.9	28.5
Foundry and machine shop products.....	100.0	100.0	21.5	0.7	30.9	4.4	31.0	18.9	15.7	55.0	0.9	21.0
Furniture.....	100.0	100.0	14.0	0.5	24.6	3.0	41.5	20.8	19.6	58.4	0.3	7.4
Gas, illuminating and heating.....	100.0	100.0	18.9	0.4	35.5	3.3	31.0	11.3	12.2	26.0	2.4	59.0
Glass.....	100.0	100.0	2.3	(¹)	6.0	0.4	32.8	10.1	57.6	78.2	1.3	11.3
Hosiery and knit goods.....	100.0	100.0	7.3	0.1	10.7	1.6	41.2	16.5	33.8	70.8	1.0	11.0
Iron and steel, steel works and rolling mills.....	100.0	100.0	1.2	(¹)	1.9	(¹)	10.6	0.4	54.7	15.0	31.6	84.6
Leather, tanned, curried, and finished.....	100.0	100.0	16.3	0.2	15.8	0.7	23.3	5.1	40.0	57.8	4.6	36.2
Liquors, malt.....	100.0	100.0	8.4	0.1	10.8	1.0	31.3	8.4	40.5	62.3	3.0	28.2
Lumber and timber products.....	100.0	100.0	37.3	3.2	38.8	12.4	19.2	26.7	6.6	52.5	0.1	5.2
Paper and wood pulp.....	100.0	100.0	3.0	(¹)	7.8	0.4	33.4	7.5	51.9	67.0	3.9	25.1
Petroleum, refining.....	100.0	100.0	3.1	(¹)	6.1	(¹)	19.4	0.6	52.0	11.1	19.4	88.3
Printing and publishing, newspapers and periodicals.....	100.0	100.0	63.8	8.7	25.5	13.7	8.2	19.8	2.3	35.7	0.2	22.1
Slaughtering and meat packing, wholesale.....	100.0	100.0	2.0	(¹)	9.6	0.1	29.5	1.0	43.5	10.2	15.4	88.7
Slaughtering, wholesale, not including meat packing.....	100.0	100.0	0.8	(¹)	18.1	0.7	36.8	6.0	37.8	38.0	6.5	55.3
Tobacco, chewing and smoking, and snuff.....	100.0	100.0	43.4	0.3	18.5	0.7	16.4	3.2	15.7	19.2	6.0	76.6
Tobacco, cigars and cigarettes.....	100.0	100.0	70.2	10.6	21.8	15.5	6.0	18.6	1.9	39.6	0.1	15.7
Woolen goods.....	100.0	100.0	16.1	0.2	10.7	0.6	23.1	7.2	48.1	74.2	2.0	17.8

¹ Less than one-tenth of 1 per cent.

These tables show, more definitely than it is possible to ascertain from the totals for the 14 generic groups of industries, the relative importance of establishments of different sizes in particular classes of products. For example, petroleum refining is included in Table LXIV in the group of "chemicals and allied products," for which 44.4 per cent of the products was reported by the 154 establishments that had a product of over \$1,000,000. From Tables LXVI and LXVII it appears that the 19 petroleum refineries of this class reported 88.3 per cent of the products of the 98 establishments in the United States. With the exception of "slaughtering and meat packing, wholesale," this is the greatest concentration in large establishments shown for any of the 23 selected in-

dustries. There is a great variation in the relative importance of the different classes of establishments as measured by the gross value of their products. Only about one-third of the industries reported the largest proportion of establishments as having a product valued at \$100,000 but less than \$1,000,000, but the majority of the industries returned the greatest proportion of products for establishments of this class.

Table LXVIII shows the number of establishments in each of the 14 generic groups of industries, distributed according to the number of wage-earners, and Table LXIX shows the percentage the number in each class constitutes of the total for the industry group. Table LXX shows the percentage that the group total constitutes of the total for each class.

TABLE LXVIII.—ESTABLISHMENTS GROUPED ACCORDING TO NUMBER OF WAGE-EARNERS, FOR THE UNITED STATES, BY GROUPS OF INDUSTRIES: 1905.

GROUP.	Total number of establishments.	ESTABLISHMENTS REPORTING—								
		No wage-earners.	Under 5.	5 to 20.	21 to 50.	51 to 100.	101 to 250.	251 to 500.	501 to 1,000.	Over 1,000.
United States.....	216,262	19,679	76,193	67,577	26,492	12,463	9,022	3,063	1,237	536
Food and kindred products.....	45,790	4,733	28,456	8,268	2,077	1,182	772	105	71	36
Textiles.....	17,042	440	1,857	5,587	4,065	2,095	1,842	682	305	139
Iron and steel and their products.....	14,239	544	2,809	4,841	2,478	1,433	1,254	507	253	120
Lumber and its remanufactures.....	32,726	788	5,595	15,942	5,899	2,451	1,400	422	114	25
Leather and its finished products.....	4,945	166	1,127	1,489	882	545	468	182	60	20
Paper and printing.....	30,787	5,080	12,984	8,355	2,145	869	565	145	30	8
Liquors and beverages.....	6,381	474	3,151	1,838	581	230	85	17	2	3
Chemicals and allied products.....	9,680	962	3,024	2,710	1,738	768	329	108	25	16
Clay, glass, and stone products.....	10,775	166	1,800	4,786	2,241	944	615	168	42	13
Metals and metal products, other than iron and steel.....	6,310	201	1,665	2,589	995	375	287	113	63	22
Tobacco.....	16,828	4,327	7,822	3,304	689	258	216	80	29	13
Vehicles for land transportation.....	7,285	341	2,248	2,645	761	420	420	237	145	68
Shipbuilding.....	1,097	118	305	357	144	77	52	18	11	15
Miscellaneous industries.....	12,377	739	3,350	4,776	1,767	816	627	189	75	38

LARGE AND SMALL ESTABLISHMENTS.

cxix

TABLE LXIX.—ESTABLISHMENTS GROUPED ACCORDING TO NUMBER OF WAGE-EARNERS—PER CENT IN EACH CLASS OF TOTAL NUMBER FOR EACH GROUP OF INDUSTRIES: 1905.

GROUP.	Total number of establi- shments.	ESTABLISHMENTS REPORTING—								
		No wage- earners.	Under 5.	5 to 20.	21 to 50.	51 to 100.	101 to 250.	251 to 500.	501 to 1,000.	Over 1,000.
United States.....	100.0	9.1	35.2	31.2	12.3	5.8	4.2	1.4	0.6	0.2
Food and kindred products.....	100.0	10.3	62.1	18.1	4.5	2.6	1.7	0.4	0.2	0.1
Textiles.....	100.0	2.6	10.9	32.8	24.0	12.3	10.8	4.0	1.8	0.8
Iron and steel and their products.....	100.0	3.8	19.7	34.0	17.4	10.1	8.8	3.6	1.8	0.8
Lumber and its remanufactures.....	100.0	2.4	17.1	48.7	18.0	7.5	4.6	1.3	0.3	0.1
Leather and its finished products.....	100.0	3.4	22.8	30.1	17.8	11.0	9.5	3.7	1.3	0.4
Paper and printing.....	100.0	18.5	42.2	27.1	7.0	2.8	1.8	0.5	0.1	(¹)
Liquors and beverages.....	100.0	7.4	40.4	28.8	9.1	3.6	1.3	0.3	(¹)	0.1
Chemicals and allied products.....	100.0	9.9	31.2	28.0	18.0	7.9	3.4	1.1	0.3	0.2
Clay, glass, and stone products.....	100.0	1.5	16.7	44.4	20.8	8.8	5.7	1.6	0.4	0.1
Metals and metal products, other than iron and steel.....	100.0	3.2	20.4	41.0	15.8	5.9	4.5	1.8	1.0	0.4
Tobacco.....	100.0	25.7	46.5	20.1	4.1	1.5	1.3	0.5	0.2	0.1
Vehicles for land transportation.....	100.0	4.7	30.9	36.3	10.4	5.8	5.8	3.2	2.0	0.9
Shipbuilding.....	100.0	10.8	27.8	32.6	13.1	7.0	4.7	1.6	1.0	1.4
Miscellaneous industries.....	100.0	6.0	27.1	38.6	14.3	6.6	5.0	1.5	0.6	0.3

¹ Less than one-tenth of 1 per cent.

TABLE LXX.—ESTABLISHMENTS GROUPED ACCORDING TO NUMBER OF WAGE-EARNERS—PER CENT IN EACH GROUP OF INDUSTRIES OF TOTAL NUMBER FOR EACH CLASS: 1905.

GROUP.	Total number of estab- lish- ments.	ESTABLISHMENTS REPORTING—								
		No wage- earners.	Under 5.	5 to 20.	21 to 50.	51 to 100.	101 to 250.	251 to 500.	501 to 1,000.	Over 1,000.
United States.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Food and kindred products.....	21.2	24.1	37.3	12.2	7.8	9.5	8.6	6.4	5.7	6.7
Textiles.....	7.9	2.2	2.4	8.3	15.5	16.8	20.4	22.3	24.7	25.9
Iron and steel and their products.....	6.6	2.8	3.7	7.2	9.3	11.5	13.9	16.5	20.5	22.4
Lumber and its remanufactures.....	15.1	4.0	7.3	23.6	22.3	19.7	16.5	13.8	9.2	4.7
Leather and its finished products.....	2.3	0.8	1.5	2.2	3.3	4.4	5.2	5.9	6.3	3.7
Paper and printing.....	14.2	28.9	17.0	12.4	8.1	7.0	6.3	4.7	2.9	1.5
Liquors and beverages.....	2.9	2.4	4.1	2.7	2.2	1.8	0.9	0.6	0.2	0.6
Chemicals and allied products.....	4.5	4.9	4.0	4.0	6.6	6.1	3.6	3.5	2.0	3.0
Clay, glass, and stone products.....	5.0	0.8	2.4	7.1	8.5	7.6	6.8	5.5	3.4	2.4
Metals and metal products, other than iron and steel.....	2.9	1.0	2.2	3.8	3.7	3.0	3.2	3.7	5.1	4.1
Tobacco.....	7.8	22.0	10.3	5.0	2.6	2.1	2.4	2.6	2.3	2.4
Vehicles for land transportation.....	3.4	1.7	3.0	3.9	2.9	3.4	4.7	7.7	11.7	12.7
Shipbuilding.....	0.5	0.6	0.4	0.5	0.5	0.6	0.6	0.6	0.9	2.8
Miscellaneous industries.....	5.7	3.8	4.4	7.1	6.7	6.5	6.9	6.2	6.1	7.1

Of the 216,262 establishments included in the factory census, the largest proportion, 35.2 per cent, employed less than 5 and only eight-tenths of 1 per cent employed more than 500 wage-earners. The remaining 64 per cent were distributed among the other five classes in the proportion shown in Table LXIX, by far the largest number of establishments employing 50 wage-earners or less. In this and the following tables the number of wage-earners used for classifying the establishments is the greatest number employed at any one time during the year, and not the average number shown elsewhere in this report. This classification tends to place a larger number of establishments in the higher classes than would have resulted from a classification based on the number constantly employed. The variation, however, is slight and does not disturb seriously the number in each group.

There were 19,679, or 9.1 per cent, of the total number of establishments that reported no wage-earners as employed during the census year. The largest number of establishments of this class were engaged in the industries of "food and kindred products," "paper and

printing," and "tobacco," respectively. In each of these three groups of industries there are many small establishments, in which there is no machinery and the owner or the owner and his family are the only operatives. Thus, though the individual establishment was of little consequence, the aggregate was of too great importance to be disregarded. Nearly every community presents examples of this kind, such as the bakeries in the "food and kindred products" group and the small job printing establishments in "paper and printing," while individual cigarmakers manufacture thousands of cigars in their own homes annually. For this reason also the same groups show the greatest number of establishments reporting less than five operatives, aggregating 64.6 per cent of all the establishments in this class. In "food and kindred products" the establishments in the first two classes formed 72.4 per cent of the total number; in "tobacco," 72.2 per cent; and in "paper and printing," 60.7 per cent.

In the industries that as a rule require the use of highly developed machinery the percentage of establishments reporting no wage-earners or less than 5

was comparatively small—only 13.5 per cent in the case of "textiles," 23.5 per cent in the case of "iron and steel and their products," and 19.5 per cent in "lumber and its remanufactures."

Of the number of establishments falling in the classes reporting 5 to 20 wage-earners, 21 to 50 wage-earners, and 51 to 100 wage-earners, respectively, the group "lumber and its remanufactures" claimed the largest percentages, amounting to 23.6 per cent of those in the first class, 22.3 per cent of those in the second, and 19.7 per cent in the last. In the last two of the classes named, the textile industries were second in the number of establishments, while they were first in the four following classes.

It is natural that the groups which contain the great factory industries of the country should show marked concentration in the classes employing more than 20 wage-earners. Thus the textile group shows 53.7 per cent of the establishments as employing more than 20 wage-earners; "iron and steel," 42.5 per cent; and "leather and its finished products," 43.7 per cent.

Table LXXI shows percentages for selected industries similar to those given in Table LXIX for the 14 generic groups of industries. This table is instructive because it deals with specified industries and thus conveys a more definite idea of the relative number of the establishments of different sizes in particular lines of manufacture.

TABLE LXXI.—ESTABLISHMENTS GROUPED ACCORDING TO NUMBER OF WAGE-EARNERS FOR SELECTED INDUSTRIES—PER CENT IN EACH CLASS OF TOTAL NUMBER FOR EACH INDUSTRY: 1905.

INDUSTRY.	Total number of establishments.	ESTABLISHMENTS REPORTING—								
		No wage-earners.	Under 5.	5 to 20.	21 to 50.	51 to 100.	101 to 250.	251 to 500.	501 to 1,000.	Over 1,000.
United States.....	100.0	9.1	35.2	31.2	12.3	5.8	4.2	1.4	0.6	0.2
Lumber and timber products.....	100.0	1.4	12.8	56.1	17.0	6.1	4.5	1.5	0.5	0.1
Printing and publishing, newspapers and periodicals.....	100.0	21.5	50.6	23.6	2.7	0.9	0.6	0.1	(¹)	(¹)
Flour and grist mill products.....	100.0	8.6	68.9	19.2	2.5	0.6	0.2	(¹)	(¹)	0.3
Foundry and machine shop products.....	100.0	4.1	20.0	37.1	18.3	10.1	6.9	2.3	0.9	0.3
Printing and publishing, book and job.....	100.0	17.8	37.5	31.3	8.3	3.2	1.5	0.3	0.1	(¹)
Lumber, planing mill products, including sash, doors, and blinds.....	100.0	1.8	22.0	44.3	20.7	7.5	3.0	0.7	(¹)	(¹)
Carriages and wagons.....	100.0	6.0	30.5	42.3	7.2	2.6	1.8	0.5	0.1	(¹)
Furniture.....	100.0	1.9	13.8	28.8	25.2	18.0	9.7	1.9	0.6	0.1
Liquors, malt.....	100.0	2.0	19.0	36.4	25.1	11.7	4.4	1.1	0.1	0.2
Ice, manufactured.....	100.0	0.5	22.1	64.6	10.8	1.8	0.2			
Boots and shoes.....	100.0	2.1	9.6	19.9	19.1	15.8	18.1	10.4	3.7	1.3
Turpentine and rosin.....	100.0	1.1	15.1	18.0	48.0	16.2	1.4	0.2		
Hosiery and knit goods.....	100.0	1.0	3.4	18.7	26.2	18.6	22.8	6.3	2.3	0.7
Cotton goods.....	100.0	0.6	1.0	4.0	8.7	15.8	32.1	18.7	11.0	7.2
Leather, tanned, curried, and finished.....	100.0	4.6	18.9	21.2	21.2	16.8	13.0	2.6	1.4	0.3
Jewelry.....	100.0	3.0	23.9	39.2	20.3	8.8	4.3	0.5		
Gas, illuminating and heating.....	100.0	2.6	42.4	30.8	10.9	6.0	3.3	2.3	0.3	0.5
Pottery, terra cotta, and fire clay products.....	100.0	2.7	13.6	19.5	21.0	19.8	18.7	4.0	0.6	0.1
Liquors, distilled.....	100.0	5.8	59.3	22.9	7.7	3.1	1.1	0.1		
Woolen goods.....	100.0	5.8	7.8	16.8	16.9	19.6	23.1	7.4	2.3	0.8
Electrical machinery, apparatus, and supplies.....	100.0	2.8	16.1	37.2	20.8	10.0	8.5	2.6	1.1	0.9
Paper and wood pulp.....	100.0		2.1	19.2	28.6	21.6	19.4	7.0	1.8	0.3
Oil, cottonseed and cake.....	100.0	0.1	0.1	17.8	52.6	24.3	4.8	0.3		
Agricultural implements.....	100.0	4.5	21.6	27.2	16.5	10.5	12.0	4.3	2.0	1.4
Silk and silk goods.....	100.0	0.3	2.4	18.4	18.9	19.9	24.4	10.9	3.8	1.0
Slaughtering and meat packing, wholesale.....	100.0		18.7	35.4	20.8	11.1	5.0	2.5	2.0	4.5
Hardware.....	100.0	4.5	19.6	30.8	19.1	8.5	10.8	3.1	1.8	1.8
Tobacco, chewing and smoking, and snuff.....	100.0	13.6	31.2	19.2	12.0	9.7	8.5	3.7	1.4	0.7
Iron and steel, steel works and rolling mills.....	100.0		0.3	3.1	4.6	7.2	24.8	26.0	20.5	13.5
Glass.....	100.0		0.5	2.5	9.5	21.3	30.8	18.8	5.8	1.8
Coke.....	100.0	0.4	3.9	18.7	26.6	29.1	16.6	3.9	0.4	0.4
Chemicals.....	100.0	1.1	19.6	34.6	19.6	9.1	8.0	4.7	1.5	1.8
Cutlery and edge tools.....	100.0	5.9	20.8	25.2	18.1	12.2	13.4	2.0	2.0	0.4
Brassware.....	100.0	3.5	28.4	32.8	19.6	5.2	6.1	3.1	0.9	0.4
Worsted goods.....	100.0		0.9	6.2	13.7	15.0	29.7	16.8	13.3	4.4
Rubber and elastic goods.....	100.0	3.1	10.7	24.1	20.5	13.4	16.1	6.7	4.9	0.5
Iron and steel, blast furnaces.....	100.0			2.6	7.4	13.7	44.7	21.6	8.4	1.6
Carpets and rugs, other than rag.....	100.0	2.2	2.2	10.1	26.6	20.1	18.0	10.1	5.0	5.7
All other industries.....	100.0	10.0	38.9	29.1	11.6	5.2	3.5	1.1	0.4	0.2

¹ Less than one-tenth of 1 per cent.

In this table the industries are arranged according to the number of establishments reported. "Lumber and timber products" reports the largest number of establishments and therefore ranks first.

While in the United States as a whole 35.2 per cent of the establishments were contained in the class which employed less than 5 wage-earners, a considerably smaller proportion was reported for this class in the majority of the basic industries, such as lumber, tex-

tiles, and iron and steel. Only one industry—"iron and steel, blast furnaces"—reports no establishments so small as to employ less than 5 wage-earners. Six of the industries report no establishments so large as to employ over 1,000 wage-earners. In 5 industries there were no establishments employing more than 500 wage-earners and in 3 others the number reported for this class was less than one-tenth of 1 per cent.

One of the most significant facts developed by the

table is that 87.8 per cent of all the establishments employed not more than 50 wage-earners, and that in the majority of the important industries the greater proportion employed from 5 to 20 wage-earners.

Tables LXXII and LXXIII show, for the 12 states reporting the largest number of establishments—first, the proportion that the establishments of each class constitute of the total for the state, and, second, the proportion which the establishments of each state constitute of the total for each class.

TABLE LXXII.—Establishments grouped according to number of wage-earners, with per cent in each class, of total for the state for twelve states having largest number of establishments: 1905.

STATE OR TERRITORY.	Total number of establishments.	ESTABLISHMENTS REPORTING—								
		No wage-earners.	Under 5.	5 to 20.	21 to 50.	51 to 100.	101 to 250.	251 to 500.	501 to 1,000.	Over 1,000.
United States.....	100.0	9.1	35.2	31.2	12.3	5.8	4.2	1.4	0.6	0.2
New York.....	100.0	9.8	33.5	31.4	13.9	5.9	3.8	1.1	0.4	0.2
Pennsylvania.....	100.0	9.2	36.8	28.4	11.8	6.2	4.8	1.7	0.7	0.4
Illinois.....	100.0	12.2	35.0	30.6	11.4	5.1	3.6	1.3	0.5	0.3
Ohio.....	100.0	8.7	35.3	30.7	12.2	6.0	4.7	1.5	0.7	0.2
Massachusetts.....	100.0	6.9	28.8	32.5	14.6	6.9	5.9	2.5	1.2	0.7
Wisconsin.....	100.0	13.2	50.6	19.7	7.1	4.2	3.3	1.3	0.5	0.1
Michigan.....	100.0	9.2	37.0	28.2	11.7	6.4	4.9	1.9	0.6	0.1
Indiana.....	100.0	7.5	37.1	33.1	10.8	5.7	4.0	1.1	0.5	0.2
New Jersey.....	100.0	8.2	33.3	29.6	12.0	7.2	5.9	2.4	1.1	0.3
California.....	100.0	10.3	38.3	33.4	9.7	4.2	2.6	0.9	0.5	0.1
Iowa.....	100.0	10.0	49.2	27.6	6.6	2.9	1.9	0.7	0.2	(1)
Minnesota.....	100.0	11.2	50.2	23.4	8.2	3.2	2.2	1.1	0.4	0.1
All others.....	100.0	7.8	32.3	34.5	13.2	6.0	4.2	1.3	0.5	0.2

¹ Less than one-tenth of 1 per cent.

TABLE LXXIII.—Establishments grouped according to number of wage-earners, with per cent in each state, of total for each class for twelve states having largest number of establishments: 1905.

STATE OR TERRITORY.	Total number of establishments.	ESTABLISHMENTS REPORTING—								
		No wage-earners.	Under 5.	5 to 20.	21 to 50.	51 to 100.	101 to 250.	251 to 500.	501 to 1,000.	Over 1,000.
United States.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
New York.....	17.2	18.4	16.4	17.3	19.5	17.4	15.8	13.7	12.8	12.1
Pennsylvania.....	10.9	11.1	11.3	9.9	10.4	11.7	12.4	12.8	14.4	15.9
Illinois.....	6.9	9.3	6.9	6.7	6.4	6.1	6.0	6.1	5.9	8.8
Ohio.....	6.4	6.1	6.4	6.3	6.3	6.7	7.1	6.9	7.6	5.8
Massachusetts.....	5.0	3.7	4.1	5.2	5.9	5.9	7.0	8.8	10.6	14.5
Wisconsin.....	4.0	5.7	5.7	2.5	2.3	2.9	3.1	3.6	3.4	2.6
Michigan.....	3.4	3.5	3.6	3.1	3.3	3.8	4.1	4.5	3.3	1.9
Indiana.....	3.2	2.7	3.4	3.4	2.9	3.2	3.2	2.6	3.1	3.0
New Jersey.....	3.2	2.9	3.1	3.1	3.2	4.1	4.6	5.5	6.4	4.5
California.....	3.2	3.6	3.4	3.4	2.5	2.3	2.0	2.0	2.5	1.1
Iowa.....	2.2	2.7	3.1	1.9	1.2	1.1	1.0	1.2	0.8	0.2
Minnesota.....	2.2	2.7	3.1	1.6	1.5	1.2	1.2	1.7	1.6	1.1
All others.....	32.2	27.6	29.5	35.6	34.6	33.6	32.5	30.6	27.6	28.5

Table LXXII shows that Massachusetts reported the smallest percentage of establishments employing no wage-earners or less than 5. Wisconsin and Minnesota, with 63.8 and 61.4 per cent, respectively, in these two classes, led in this particular. Massachusetts also reported the largest proportion, 1.9 per cent, employing more than 500 wage-earners. Iowa reported the smallest percentage of establishments of this class.

Table LXXIII gives ample evidence of the preponderance of New York and Pennsylvania in manufactures. These two states contained 28.1 per cent of all the establishments in the country, and with the exception of the class containing establishments with 1,000 or more wage-earners, in which Massachusetts outranked New York, each had a larger proportion in each class than any other state. In the class reporting 251 to 500 wage-earners New York, Pennsylvania, and Massachusetts controlled 35.3 per cent of the total number of establishments; in the class reporting 501 to 1,000 wage-earners, 37.8 per cent; and in the class reporting over 1,000 wage-earners, 42.5 per cent.

From the preceding tables and from the detailed tables given in the body of this report it is evident that the small and medium-sized establishments, those with a product of less than \$100,000, predominate largely in the vast majority of the manufacturing industries of the country, but that in comparatively few industries does the value of the products of such establishments form as much as 50 per cent of the total value of products. While the large establishments, those with a product of \$100,000 and over, are comparatively few in number, the value of their products is so great as to exceed the products of all other establishments. In the majority of industries the number of these establishments forms less than 20 per cent of the total number, but their products form considerably more than 50 per cent of the total products, rising as high as 99.4 per cent in petroleum refining, as shown in Table LXVII; in all of the basic manufactures such establishments predominate largely in the value of their products.

Centralization of control.—One of the most effective methods of forming a large manufacturing enterprise is to consolidate existing independent establishments. Such a method eliminates all of the uncertainties attending the inauguration of new establishments. The business relations are formed, the sale of the products, and consequently the profits, are in a measure assured, and the uncertainty attending the investment reduced to a minimum. Either independent plants may be purchased or erected to meet the increase of business, or a new company may be formed for the sole purpose of bringing together under one management formerly independent mills. It is impossible to trace the formation of large enterprises by the former method, which is simply a gradual and natural increase in the size of existing companies. The application of the latter method, however, requires the formation of a new company, which acts frequently under a charter obtained for the purpose of combining independent plants. It is practicable to trace the formation of such companies and to present statistics indicating the magnitude of their operations. During and just previous to the fiscal

year covered by the census of 1900 there was unusual activity in the formation of companies in this manner, and great importance was attached to information concerning them. Statistics for them were accordingly compiled and presented under the title of "industrial combinations," the class of corporations included being defined as follows:

For the purpose of the census, the rule has been adopted to consider no aggregation of mills an industrial combination unless it consists of a number of formerly independent mills which have been brought together into one company under a charter obtained for that purpose. We therefore exclude from this category many large establishments comprising a number of mills which have grown up, not by combination with other mills, but by the erection of new plants or the purchase of old ones.

To be included under this definition the company must have been formed under a special charter obtained

for the purpose of consolidating the control of independent plants. Therefore the statistics did not represent all instances where a number of plants were operated under the same control. It is difficult to ascertain whether, and to what extent, there are written or verbal agreements under which some manufacturing plants are controlled by one management. The application of census methods did not enable the office to obtain statistics which could be accepted as representative either of the number or magnitude of combinations of formerly independent manufacturing enterprises, or of instances in which a number of plants were operated partially or entirely under the same ownership without charters or special acts of incorporation, yet coming within the scope of centralization of control. Therefore the presentation has been abandoned.